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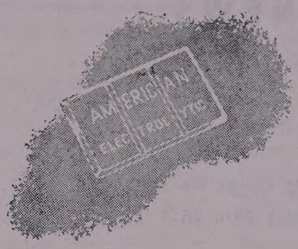

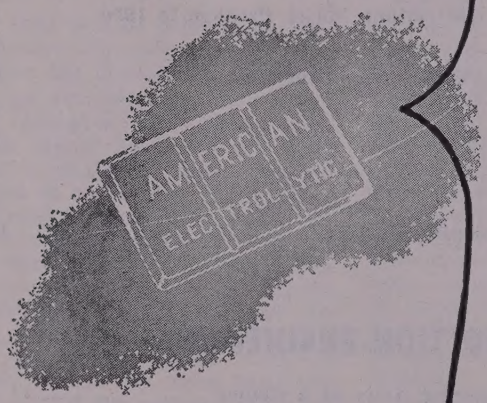

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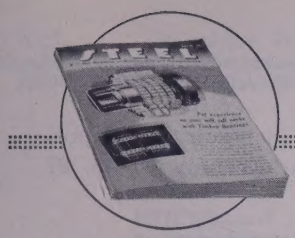

December 26, 1949

Facts About Prices

By the time congressional committees get around to investigating increases in steel prices, it will be apparent to everybody that the current price changes involve much more than an attempt to offset rising costs. It is true that the sellers expect to receive an average of $4 more per ton than they have been receiving, but at the same time drastic changes in extras are being introduced which are destined to have a profound influence on the buying habits and manufacturing methods of steel consumers.

Because of complications involved in extras, many buyers of steel will not be able to figure the exact effect of the new prices for weeks or even months. One of the first jobs to be tackled by fabricators and manufacturers will be an intensive study of specifications in relation to the new extras. In many instances, it will be found that some extras can be avoided by more intelligent specifying.

Beyond this lies a broad field of opportunity for gradually changing design of product to utilize the grades, gages, widths, lengths and finishes of steel which can be purchased most advantageously from a price standpoint. It should be borne in mind that some old extras had remained unchanged for as much as 14 years. The new extras are intended to reflect current mill practice. Many steel users probably will find it profitable to make marked changes in the form of steel purchased.

Another point which will arise in the congressional hearings is the impact of the new pension plans upon manufacturing costs, not only of steel but of products manufactured of steel. When Senator O'Mahoney blasted United States Steel Corp. for raising prices, he undoubtedly was influenced by his well known antipathy to corporate bigness. Testimony at the hearings will show that prices have been increased by practically all steel producers, regardless of size. Also it could be shown that steel consumers were contemplating increases in the price of their products to compensate for pensions and other higher costs even before steel prices were raised.

It was unrealistic ever to believe pensions, higher rail rates and other rising costs could be absorbed without increasing prices. A fair congressional hearing probably would make this fact crystal clear.

* * *

FAIR WEATHER AHEAD: As the yearend approaches, the economic forecasters are saying that we can expect fairly good business weather during the first quarter. These predictions are made at a time when some of the major industries are driving at full speed to make up for past losses occasioned by strikes.

Steel ingot operations are holding at around 95 per cent of capacity. The automobile industry is going strong and is preparing for a record-breaking spurt on new models in January, with some overtime operations scheduled. Electric power output, which annually touches its seasonal high point in December, has established new all-time records of output in two consecutive weeks.

Most noticeable exceptions to these optimistic signs are found in fuel and transportation. Revenue railroad freight car loadings are down substantially from levels of a year ago. Bituminous coal output is roughly 25 per cent below production in corresponding weeks of 1948, due to the current three-day week. Production of petroleum also is lower, but by a much lesser margin than coal.

Economists see two factors which will help to

(OVER)

buoy purchasing in early 1950. One is the $3 billion to be distributed to veterans in insurance refunds. The other is an estimated $1 billion in Series D savings bonds which were sold in 1940 and will mature in 1950. Bond redemptions will be an important factor throughout the next decade. —pp. 22, 37

* * *

WILL STUDY U. S. TAXES: Next year will witness further attempts to adjust federal taxes. Shortly after Congress reconvenes on Jan. 3, the House Ways & Means Committee will go to work on its promise to initiate tax revision. It is expected it will tackle excise taxes first and there are signs that committee members are hoping to cut excises by about $1 billion a year.

If this is done, there will be an immediate clamor for recouping the $1 billion from other tax sources. It is likely the committee will consider the possibility of taxing some now tax-exempt income, such as that of co-operatives, and from the investments of churches, trusts, foundations and educational institutions.

The committee also may weigh the proposal to eliminate double taxation on corporate earnings. Most encouraging is the feeling, expressed by Chairman Robert L. Doughton and other members of the tax-originating committee, that they are definitely opposed to any major tax increase in 1950 even if President Truman should renew his previous request for such increase. —p. 24

* * *

TV IS VIGOROUS YOUTH: Developments in television are beginning to demonstrate in a striking manner what volume means to a vigorous, fast growing industry.

In 1946, production of receiving television sets was 6500 and the average retail price was $450 per set. In 1947, output was 175,000 and the average retail price was $400. In 1948 the corresponding figures were 975,000 and $378. In 1949, it is estimated production will be 2.6 million and the average price to buyers is $340. The outlook for 1950 is a production of from 3.5 to 4 million sets and an average retail price substantially below $340.

It is premature to make any serious comparisons between television today and the youthful automobile in 1910. However, people in Los Angeles County in October spent about $10 million for television sets as against about $30 million for new passenger automobiles. Television definitely is going to become an important factor in our national economy. —p. 27

* * *

A CHANCE FOR EUROPE: An overall appraisal of yearend conditions in Western Europe indicates that the major problem of countries in that area in 1950 will be distribution, not production. With expansion plans for the steel industry involving $1 billion in the United Kingdom, $600 million in France and $380 million in Benelux, the specter of overproduction may be worrying steel producers before long.

Relief from this worry could come from a more fluid exchange of goods between nations. The Benelux idea, proposed in Uniscan, Fritalux and other combinations, offers a solution, providing traditional obstacles can be overcome. If nationalistic scruples could be subordinated to the aim of greater prosperity for all of Western Europe and the United Kingdom, the mass market of that area could support an economy not unlike that of the United States and Canada.

It's a long shot, but well worth the gamble. —p. 28

* * *

ABC OF WIREMAKING: Eighteenth in this publication's series of articles on the fundamentals of steelmaking is a treatise on the "Production of Wire and Wire Rods" by Kenneth B. Lewis, consulting engineer, Worcester, Mass. Mr. Lewis needs no introduction to persons interested in the wire industry; he has been a leading contributor to the literature of wiremaking for more than four decades.

In the first installment, appearing in this issue, Mr. Lewis presents the exceedingly interesting historical background of the wire industry and then discusses the principal operations in the production of wire rods and the drawing and ancillary operations in the manufacture of wire. To test the clarity of his writing, read his discussion of what happens when steel is drawn through a die. He writes in a style which, although easily understood by the layman, is highly respected by the most advanced students of the subject. —p. 58

Happy New Year!

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

PRICES— A revolution in buying habits may be necessary to minimize the effects of the general steel cost boost coming from higher base prices and extra charges (p. 17). Perhaps you can whittle costs by eliminating extra fees for special handling, weatherproofing or chemical analyses. But no matter how careful the buying, steel costs will go up for many users—$2 per refrigerator for appliance makers. Brief summaries of the extra revisions on major products appear on pp. 18-20 . . . Reactions to the price hikes are relatively mild. United Steelworkers will abide by their contracts (p. 17). The congressional investigations of raises will be little more than political gestures (p. 18).

NEW OVERTIME RULES— A business headache which had reached migraine proportions for many will be relieved Jan. 25 when new overtime amendments to the wage-hour law go into effect (p. 21). The amendments are really clarifications of the language in the earlier law to prevent overtime-on-overtime disputes. "Regular rate" on which overtime can be figured is defined, and fringe payments are specifically listed that cannot be continued as part of the "regular rate." The Labor Department has also adopted revised regulations governing the cases where white collar workers are exempt from the wage-hour law.

BUSINESS PROSPECTS—Expect good business for at least the next two or three months as industry continues its drive to make up strike losses (p. 22). The steelmaking rate last week was 94.5 per cent of capacity. Automakers will push production to the limit beginning Jan. 3. The $3 billion insurance refunds to veterans will start in February and will spur the economy. So will the estimated $750 million coming to consumers in 1950 from matured defense bonds bought in 1940. Maturity dates on Series D and E bonds for the next several years will be coming thick and fast.

TAXES— Even the tax situation might improve in 1950 (p. 24). Chairman Robert L. Doughton of the House Ways & Means Committee has promised to start work revising excise taxes to encourage business. He says $1 billion yearly can be pared from excises if substitute revenue is found. The substitute could come in a tax on now-exempt farm and labor co-operatives.

TELEVISION— A thriving youngster in the metalworking industry is television (p. 27). At the end of the war, only 10,000 sets were in operation in the U. S. About 2.6 million will be made in 1949. The way the infant is growing, as many as 4 million sets may be produced in 1950.

CHRYSLER AUTOS—Chrysler Corp.'s new line will be shown soon (p. 31). Style changes seek to achieve a lower silhouette. Plant capacity has been boosted to 7100 per day, against 6400 at the beginning of 1949. The new rate should be achieved by February or March.

EUROPE— Marketing, not production, will be the chief problem for Europeans in 1950 (p. 28). ECA's output goals will be nearly reached by 1952. Devaluation may be one way to spur sales, particularly to hard-money areas, but it's a short-term expedient. What is needed is a U. S. of Europe with no tariff walls and no compartmentized industries. A realistic approach to the problem could be more economic unions modeled after the Benelux group.

HERE AND THERE IN INDUSTRY—U. S. Steel Corp. has made management shifts in its subsidiaries: Clifford F. Hood becomes Carnegie-Illinois Steel Corp. president; Harvey B. Jordan succeeds him as American Steel & Wire Co. president; James E. Lose becomes excutive vice president of Carnegie; Charles R. Cox, former Carnegie president, becomes the Kennecott Copper Corp. head (p. 23) . . . Canadian steel prices won't go up for the present even though controls were lifted Dec. 1 (p. 29) . . . Lukens Steel Co. will close its 206-in. mill for 90 days beginning Jan. 22 to change the power plant from steam to electricity (p. 23) . . . The iron and steel industry's payroll for the first nine months of 1949 was higher than for any other like period (p. 21).

Engineering News, p. 45 *Market Summary, p. 83*

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STEEL
A PENTON PUBLICATION

More Careful Steel Buying Seen

Upward revision in extra charges dictate that metalworking companies watch specifying more closely. Many charges for special services may be eliminated

STEEL USERS will buy more carefully as result of the extensive revisions in extra charges. Careless habits in specifying will be largely corrected—particularly when the fact hits home to the buyer that he has to pay for all extra handling, packaging, steel analysis and similar extra work.

That is the consensus of metalworking executives and steel sellers as they study the effect of the $4 a ton average increase in steel prices. Practically all major companies are following the lead of U. S. Steel in making the upward adjustments. The increase pattern is fairly uniform. Some minor variations will appear as the independent mills announce their product quotations and extra lists.

Costs To Go Up—Even with careful specifying to offset in part the higher prices, most steel users will find they will pay more for steel. The base price advance and the extra revisions will add an estimated $11.79 to the cost of steel going into an average small automobile (p. 19). Actually the cost to auto builders will even be considerably more as the steel is fed up to them through their suppliers who also are meeting higher costs. Steel men estimate that the higher prices will mean about $2 a unit to refrigerator builders. The effect on the unit cost of small motors will be negligible.

Some Benefits to Users—Some steel users will find their extra costs may be lower than they have been, if they use products which have benefited most from recent technology and if they specify cannily.

For all consumers the new extras will dictate that the steel buyer know more about his own conditions and manufacturing procedures and that he govern his steel buying accordingly. It, in essence, will make him know what he needs. Possibly it may lead him into cost-saving methods that previously were overlooked.

Experience To Reveal Costs—In view of this there can be no glib answer at most metalworking plants as to how much the price revisions mean on the steel bill. It will take a lot of living with the new prices and extras before most can know how they have been affected.

Within the mills these answers are not yet known. Sales correspondents and billing people are spending long hours learning the new schedules so that they can answer customers' questions and catch up on their routine work. Paper work and billings of necessity slowed down with introduction of the new lists, and the lag until new procedures are established will be considerable.

Reflects Today's Costs—Certain of the new extra cards supersede lists of as long standing as 14 years. Others bring up to the minute cost studies which have been in progress for at least two years on some products, and now reflect the actual cost of the operations involved, whether it be of a chemical, mechanical or by-hand nature. These costs are well documented and will be presented if a congressional investigation is made.

So sweeping are the changes, that generalization as to the quantitative amount of the change, is virtually impossible.

Narrow Widths Increased—The hot-rolled sheet user will be quick to note that his wide and lighter-gage coils now carry lower extras, but at the same time, he'll see a substantial increase in the extras on narrow widths. Such rejuggling is the result of the evolution in steelmaking practice, a turnabout at last fully recognized which brings prices into line with modern equipment. He finds packaging extras much simplified, but he'll have to think hard before demanding small lifts and special wrapping. Such services, in some cases, have been expected as a matter of course and without considering if they are actually needed. Special bundling is not essential to some users: Material exposed to atmospheric changes in transit and in storage to some extent negate the protection that packaging offers. On some products users will become much more chemistry conscious. They will probably be more cautious, too, in ordering unnecessary cutting.

No New Wage Demands

United Steelworkers will abide by their contracts. These generally permit no reopening for wage negotiations until next winter, union spokesmen say. There will be no demand for upward wage adjustments as result of the steel price advances.

The President's fact-finding board in recommending pensions for steelworkers last September held the workers were not entitled to any wage increases. It suggested if

How New Size Extras Affect Cold Sheets

Cold-Rolled Sheets—Per 100 Pounds

Commercial Quality (60" by 120")	20 Gage New	20 Gage Old	22 Gage New	22 Gage Old
Base	$4.10	$4.00	$4.10	$4.00
Gage and Width extra	.45	.45	.50	1.00
Length extra	.10	None	.10	.20
Totals	$4.65	$4.45	$4.70	$5.20

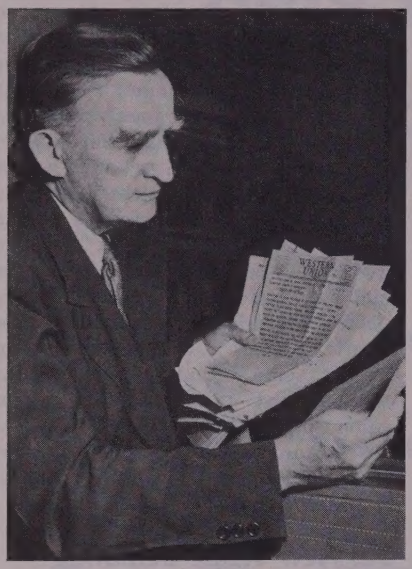
Commercial Quality (36" by 120")	20 Gage New	20 Gage Old	22 Gage New	22 Gage Old
Base	$4.10	$4.00	$4.10	$4.00
Gage and Width Extra	.35	.25	.45	.35
Length Extra	.10	None	.10	None
Totals	$4.55	$4.25	$4.65	$4.35

Commercial Quality (20" by 120")	20 Gage New	20 Gage Old	22 Gage New	22 Gage Old
Base	$4.10	$4.00	$4.10	$4.00
Gage and Width Extra	.75	.35	.90	.45
Length Extra	.10	None	.10	None
Totals	$4.95	$4.35	$5.10	$4.45

prices were increased, there would be justification for the union to ask wage increases.

Price Probe Political Poke

The widely advertised investigation of the steel price increase by two congressional committees early in January will be little more than a



SEN. JOSEPH C. O'MAHONEY
. . . steel price rise not justified

political gesture. Primarily it will be used to take a poke at big business.

Many congressmen believe that an increase in steel prices became inevitable when the United Steelworkers won their demand for industry-financed pensions.

They think that the $4 a ton increase is a modest one.

Sen. Joseph C. O'Mahoney (Dem., Wyo.), chairman of the joint economic committees and prime mover of the investigation, contends that the increase is not justified on the basis of steel industry earnings in the first nine months of 1949.

Rep. Emanuel Celler, (Dem., N. J.), who would like to break big industrial units into little ones, sees the price advance a result of bigness in business.

Sen. Robert A. Taft (Rep., O.) gives limited approval of the steel price investigation but cautions that in the long run pensions are going to mean higher prices.

Says he, "You can't get something for nothing."

President Ben Fairless of U. S. Steel says the corporation will welcome an opportunity to appear before Congress and present the facts and figures establishing that its increased costs, including the new insurance and pension programs, allow no alternative to increasing costs.

Revision on Extras

Designed to bring charges in line with today's operating practices

STEEL BUYERS will want to examine carefully the new extra cards for the products that they use. A few companies are sending the new extra lists to their customers, but others do not yet have them printed.

The following give thumb nail sketches of the major changes for leading products and are based mostly on U. S. Steel subsidiaries' cards:

Hot-Rolled Sheets

The basic finished sheet product now is hot-rolled mill edge coils. Schedules provide compensating extras for additional processing such as cutting to length, edge shearing, etc.

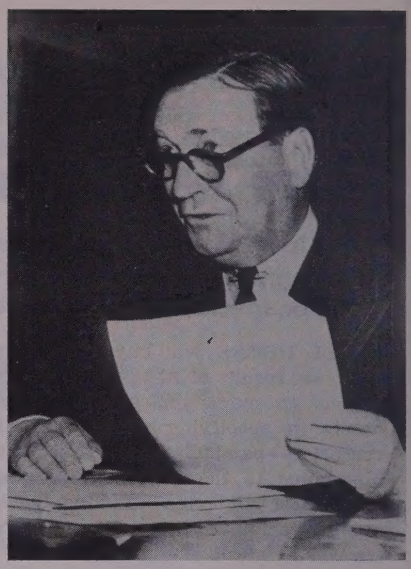
Width and gage ranges in size extra table for hot-rolled coils have been condensed with applicable extras advanced up to $8 per ton in the heavier gages and narrow widths, and reduced up to $3 per ton for light gages in wide widths. A table of mill edge sheet length size extras, covering 8 length brackets and 3 gage ranges, has been established.

Former special requirement extra of 60 cents per 100 pounds has been broken up into a listing of specific extras for special tests or quality specified, such as "special soundness steel," etc. Similar action has been adopted on all sheet and strip items.

Basis for pickling and heat treatment extras has been altered, with applicable extras hiked up to $5 a ton.

Other processing extras, such as resquaring, stretcher leveled and extra

SEN. ROBERT A. TAFT
. . . you can't get something for nothing



BENJAMIN F. FAIRLESS
. . . will give Congress facts and figures

smooth extras were also advanced. Some specifications extras and also the silicon extra were advanced $2 per ton. Similar upward adjustments were made on other sheet and strip products. As in case of all sheet and strip items the packaging extras have been simplified and revamped to reflect total costs for various services rendered.

An extra has been established for all paper wrapped or covered packages of circles or cut lengths regardless of package weight, as has an extra for paper shrouding packages or load. Individual coil packaging extras have been consolidated into one charge per coil, instead of being graduated by coil weight. An extra is now applicable for all paper wrapped or covered coil packages, regardless of package weight.

Extras for multiple lift packages and hand bundles were advanced; those extras for wooden boxes or crates are now one charge for crate or box regardless of weight up to a minimum of 1000 lb. A packing extra in the hot-rolled strip card has been established for paper shrouding packages or load.

Cold-Rolled Sheets

New extras recognize cost differentials between coils and cut lengths, as outlined under hot-rolled sheets. Since cold-rolled sheets are normally supplied cut edge, no attempt has been made to distinguish between mill and cut edge. An additional important change involves the classification of cold-rolled sheets as cold-rolled strip when single strand rolling in widths under 24 inches is required. There is no gage break in stretcher leveled extras, and this extra has

been advanced $5 per ton for 22 gage and lighter.

Vitrenamel Sheets

Extra changes follow pattern of cold-rolled sheets, with the exception that there is no extra for cut lengths over 80 in.

Galvanized Sheets

Gage and width extras have been combined under the size extra breakdown to be consistent with other sheet products. Commercial coating as well as heavier than commercial coating extras, to be added when zinc exceeds 5 cents per pound, now cover each gage instead of gage ranges as heretofore. This practice makes it possible to merely add the applicable coating extra for zinc to the equivalent gage price. Culvert sheet pricing now includes applicable extras for length.

Formed Roofing, Siding

Since these products are sold on a per square basis, Carnegie-Illinois has reverted to the practice of computing the price per 100 lb and then multiplying by the published weight per square to arrive at the price square. Therefore roofing and siding extras, including the forming charges, but excepting a few unit packaging extras, are on a cents per pound basis. They may be added to applicable flat galvanized sheet pricing base and extras per pound. Item quantity extras have been established for odd sizes, special grades and gages other than the standard galvanized sheet gage. Order quantity extras for both standard and odd sizes have been advanced, notably in small quantity brackets which were increased up to $8 per ton.

There is no change in the pricing of roofing accessories, although some revisions in the forming charges per 1000 lineal ft have been established.

Long Ternes

Gage and width extras have been combined in one differential to be consistent with other sheet products. Restricted thickness tolerance extras, most processing and quality extras and packaging also were advanced in line with upward adjustments of other sheet items.

Silicon Sheets

Gage and width extras have been combined in the dimensional size extra listing, resulting in a range of increases and reduction in line with hot and cold-rolled sheets. As in other sheet products there is now an extra for each length. Previously 96 x 124 in. was the base. Deoxidized extra

(*Please turn to page* 20)

How Much Will Automaking Costs Go Up?

HOW MUCH will the higher steel prices affect the cost of automobile manufacture? What will be the result on auto prices?

Those were two hot questions in Detroit last week. They were heard over the loud grumbling of automaking executives who have been trying to work their prices down. There were muttered threats of "putting some real pressure on those steel boys."

Squeezed between the automakers' desire to lower prices and the higher cost of steel are the parts suppliers. They are faced not only with higher costs for steel as occasioned by pension and insurance plans but with meeting the impact of those plans in their own plants. They have what amounts to a double boost to unload on automotive customers.

As a starter for determining the result of higher steel prices, weights of various types of steel used in making the average automobile may be related to the increase in base price and extras (STEEL, Dec. 19, p. 45) in this way:

Product	Weight Required (in lb)	Increased Cost
H. R. bars	535	$1.47
C. R. bars	80	0.22
H. R. sheets	1650	5.97
C. R. sheets	960	2.88
Wire products	185	0.69
Terne plate	45	0.32
Other plate	45	0.09
Pipe and tubing	10	0.08
Structurals	30	0.07
All steel	3540	$11.79

The weights on the different products are estimates developed by the American Iron & Steel Institute. They represent "purchased" weights, including material that is machined off or otherwise removed in making the finished component. They were compiled in 1946; so don't take them as being accurate today. Take the total on hot-rolled sheets (including strip). It looks as though it's on the high side because in recent years it has been difficult to buy hot-rolled sheets and strip in the lighter gages. Mills prefer to reduce the material to cold-rolled and sell only the heavier gages hot-rolled. The price increase (base plus average extras) is about the same on the two types of sheets. But, hot-rolled strip carries no increase in base; cold-rolled strip was advanced $3 a ton in base and probably an average of $7 more to cover extras.

The foregoing summary of steel costs leaves out this fact: Much of the steel represented comes from parts sources, and in some cases the tier of sources for a single part may be two or three deep. Take the case of a cold-headed part that starts at the steel mill in, say, the form of wire rods, then goes to a cold-drawing plant, then to the cold-heading source, and finally gets in the hands of the automotive buyer. By that time wire rods have been kicked up a minimum of $16 per ton, base and extras; so the cold drawer has to pay his premium—plus the cost of pensions and insurance that he most certainly will be saddled with. Then the cold-drawn material goes to the header—and he has his own pension plan to pay for, too—and he finally sends it to the auto plant.

Now, if pensions cost, roughly, $3 a ton—probably a low figure for a small manufacturer—then the automaker gets a total boost of $22 a ton on his cold-headed parts. He won't like it. But he won't have any alternative. He'll have to pay for it.

The large auto companies have been studying the steel price picture ever since the first hints of an increase were heard. Their executives realize the futility of trying to put the squeeze on the vendor. That would only drive him out of business.

B. E. Hutchinson, chairman of Chrysler's finance committee, has said that his people figure a $3 per ton increase in raw steel would mean a $50 to $75 increase in the retail price of the average car by the time all the inflationary factors along the devious supply road are taken into account. And that includes not only steel, but glass, rubber, textiles, etc.

Mr. Hutchinson admittedly is not one to wax too enthusiastic over the economic outlook. Few financial experts are. But even if you discount his figures by 25 per cent, auto buyers seem to be faced with prospects of paying $40 to $60 more for the cars being built today. Such a development might throw the market into a stall. Then everyone concerned would be in the soup.

has been advanced $3 per ton. There is no longer a distinction in base prices between hot and cold-rolled. Silicon sheets are now based on 22 gage with a $10 per ton differential between cut lengths and coils. This differential formerly was $5.

Hot-Rolled Strip

Cut edge and cut length extras now include both thickness and width. A mill edge extra has been introduced when required in widths 2-inches and under since cost of single strand rolling is extremely high in these narrow dimensions. A new table of extras for substandard coil weights has been introduced. Extras for quality, specific and restricted test requirements, specification extras and packaging were made to conform with like revisions in sheet products.

Hot-Rolled Bars

Size extras on per ton basis have been revised upward as follows: Rounds and squares, maximum of $5, principally 47/64-inch and under; hexagons, maximum of $8, and provides a revision in size ranges and realignment to provide increments consistent with the table for rounds and squares; ovals, $15 on all sizes; half ovals, $8 all sizes; half rounds, $2 all sizes; angles, maximum $10, most sizes advanced $5 to $9; channels, maximum $12, principally $6 to $9; flats up a maximum of $7 per ton. Length increments are revised; increments 5 feet and longer now read "over 5 to 10 feet inclusive." This results in lower extras for some specified lengths. Quantity extras increased $1 to $13 per ton for quantities under 5 tons. A new item extra for exact quantity of $2 per ton has been established. Special bar quality, additional restrictive requirements and MX quality extras also are increased $2 per ton.

Carbon extras increased $1 per ton on low carbon maximums. New range is established in manganese extras and increases range from $2 to $4 per ton. Pickling extras are advanced $2 to $5 per ton. Special straightness extras increased $2 to $4 per ton.

H-R Alloy Bars, Semifinished

There are no changes in the grade extras covering standard steels. Additional tables are incorporated in the extra card illustrating in detail the results of a lengthy study of raw material component costs and other cost factors in the production of other than standard steels. The study analyzes: The efficiency of various materials used, such as ferrochromium which is higher in high carbon steels than in low carbon grades; determination of effect of high alloy steels in combination with high or low carbons which in some instances necessitated grinding operations rather than chipping for surface cleanup; also an analysis of percentage of off heats as an added cost factor. The sulphur table has been revised to more accurately reflect the effect of sulphur in combination with other elements such as nickel, copper, high and low carbon grades. Straightness extras have been advanced $8 per ton on rounds, squares, and hexagons under ½-inch, and flats in foot weights under one pound; also $2 per ton on rounds, squares and hexagons ½ to 1-inch inclusive, and flats in a foot weight of 1 through 3 lb inclusive. When bars are required rolled from billets ground all over or when billets, blooms and slabs are required conditioned by grinding all over, the extra has been increased $5 per ton. Quantity extras on both bars and semifinished have been increased in two quantity brackets of under 3 to 2 tons inclusive and under 2 to 1 ton inclusive.

Hot-Rolled Alloy Strip

The revised preface notation in the extra card, regarding percentage extras, will limit extension of such extras through the second decimal only, instead of through the fourth decimal as heretofore. This will not apply to extra for restricted chemistry. Grade extras, including electric furnace differentials, are computed in same manner as on alloy bars. Extra for grinding of billets, i.e. strip rolled from billets, is advanced $5 per ton. Quantity extras revised upward in same brackets as for alloy bars, under 1-ton now available only on application

Hot-Rolled Alloy Plates

Extras on sketch plates revised from 20 to 25 per cent on regular sketches, and from 35 to 40 per cent on irregular sketches. Special cutting extras 2⅜-inch thick or under have been advanced up to $2 per ton in the narrow thickness range. Extra for edge treatment also increased $2. Pickling or chemical descaling extra is revised and no longer controlled by thickness. The revised control is based on width ranges for the pickling extra. Blast cleaning extra is increased 3 cents per square foot of surface area for all thicknesses. Quantity extras previously published for brackets under 2000 to 1000 lb at $1.50 per 100 lb and under 1000 lb at $2 per 100 lb are restated and are now "on application but not less than" the extras mentioned.

Carbon Plates

Item quantity extra of $2 per ton for under 10,000 to 6000 pounds added to table; the 6000 to 4000 pound bracket is unchanged while others are advanced up to $10 per ton to reflect increased costs in handling of small orders. Thickness extras are advanced in two ranges up to $4 per ton. Width ranges in width extra table revised and advanced up to $5 per ton. Extras are now incorporated in the card for widths over 6 to 24 inches inclusive on universal mill product and other than sheared mill product. Circular and sketch plate extras advanced up to $3 per ton in the classifications of regular and irregular sketch. Gas cutting extras are raised up to $2.50 per ton in thickness 2⅜-inch and under. Extras for normalizing or annealing or stress relieving, double treatment when annealing and normalizing or normalizing and stress relieving are specified, spherodize annealing, quenching and drawing or tempering, pickling, and blast cleaning have been advanced within range of approximately 50 cents to $10 per ton.

Specification and restricted chemical requirement extras also were revised upward in some instances.

Carbon Shapes

The size and section extras for the various classifications have been regrouped in many instances and applicable extras increased from $1 to $6 per ton, to more accurately reflect varying lengths of mill rolling time and a number of other production costs.

Extras in several size specifications are left unchanged and a few reduced $1 per ton. Length extras within 8 to 80 feet are revised in the length extra table, with base length now 8 to 40 feet inclusive. An extra of $1 per ton is now charged in length range of 40 to 60 feet; other length range extras are unchanged. This action might retard steel distributors from ordering in cut lengths to extent they have in past. Other extra revisions include: Advance of $6 per ton in pickling; a new extra of $3 per ton for wrapping of shape sections up to 6-inches inclusive in depth; advance of $5 in painting extras; and an increase of $1 to $2 for restricted chemical requirement extras.

Latrobe Raises Prices

Latrobe Electric Steel Co., Latrobe, Pa., effected a 10 per cent increase in mill prices and extras Dec. 23 on high speed steels, tool and die steels and carbon tool steels.

Overtime Rules Go Into Effect Jan. 25

Amendments to Fair Labor Standards Act define "regular rate" on which overtime is paid and list fringe items excluded from regular rates

ONCE a businessman in Omaha worried so much about what the wage-hour law means by "regular rate of pay" that his hair turned white in a week's time. The problem was this: His union was suing him for $37,343 in back overtime on the basis that "regular rate" included the Christmas bonus he had been paying for 11 years. He had been figuring overtime as one and a half times the base hourly rate. The union said the "regular rate" was the base plus the bonus prorated over the hours worked in the year.

The man from Omaha can relax more now because on Jan. 25 amendments passed last October to the Fair Labor Standards Act go into effect. They define "regular rate" and specifically list fringe payments which are not to be counted as part of the "regular rate."

Bonuses—On and after Jan. 25, ignore Christmas and other special bonuses in computing overtime pay if they are rewards for service and are not calculated by or dependent on the number of hours worked, the worker's production or his efficiency.

Service Payments—A payment for services performed during a specified period can—sometimes—be excluded from the regular rate. Here's the test:

If the employer alone decides on the amount to be given and that the payment is to be made, it can be excluded. If there is a prior agreement with the employee on the amount and that it will be paid, it must be included.

Profit-sharing or savings-plan payments are excluded from regular rates if the plan qualifies under regulations which the wage-hour administrator will issue, probably early in January. One stipulation here may be that payments cannot be based on individual output or efficiency.

Time Not Worked—Pay for time not worked does not affect the regular rate on and after Jan. 25. In computing overtime, exclude from the regular rates, pay for unworked holidays, vacations, absences because of illness, periods when there isn't any work—including layoff pay—and reporting pay.

Also excluded from the regular rate are "talent fees" still to be defined by the administrator and pensions and welfare-plan payments made, irrevocably, by an employer to a trustee or third person.

Premium Payments — Time-and-a-half premium payments have no effect on the regular rate. Some of them can even be applied against any overtime pay due under the law. Instances where this can be done are these:

Weekend or holiday work: A premium rate of 50 per cent above regular pay for work on Saturdays, Sundays, holidays or the employee's regular day of rest or the sixth or seventh day of his work-week, can be credited against overtime due under the law.

Work outside normal shifts: A premium of at least 50 per cent paid under a union contract for work outside the basic, normal or regular work-day or work-week fixed in the contract can be offset against overtime under the law.

Annual-Basis Contracts — The amendments also liberalize the term "annual basis." An annual wage contract will satisfy requirements for overtime-rate exemptions if it guarantees at least 1840 hours of work a year and not more than 2240 hours in any 52 week period. If the contract provides for fewer than 40 hours a week, it will satisfy requirements if it guarantees 46 weeks.

Should your annual-basis contract satisfy those requirements, overtime must be paid:

If the employee works more than 12 hours a day or 56 hours a week.

If the actual hours worked exceed the number guaranteed in the contract. (Pay time-and-a-half after 40 hours in a week.)

If total hours worked during a year exceed 2080. (Pay time-and-a-half for all hours worked in excess of 2080.)

"White Collar" Rules Made

Adoption of revised regulations governing minimum wage and overtime exemption of certain "white collar" employees under the wage and hour law is announced by Department of Labor's Wage and Hour and Public Contracts Divisions.

The revised regulations, to take effect Jan. 25, will continue to apply to about 2.5 million employees. These are part of the Fair Labor Standards Amendments of 1949, which increase the wage-hour law minimum wage to 75 cents an hour and make other changes.

The new regulations contain tests of duties, responsibilities, salary levels and other basic requirements that employers must apply in determining what employees may be exempt from wage and hour provisions of the law as executive, administrative, professional, local retailing or outside salesman types of employees.

The tests for exemption under the revised regulations include these requirements:

That executive employees must perform managerial duties, and be paid at least $55 a week or $238.33 a month.

The administrative employees must perform office or nonmanual field work of substantial importance in the management or operation of the business, and be paid at least $75 a week or $325 a month.

That professional employees must perform work requiring advanced knowledge in a field of science or learning, or perform creative work in an artistic field, and be paid at least $75 a week or $325 a month.

That local retailing employees must make local retail sales of goods or services, or perform work immediately incidental to such sales.

That outside salesmen must be engaged to sell, away from their employer's place of business.

There are no salary tests for local retailing or outside salesmen employees. A bulletin on the new regulations will be available Jan. 1.

Apprentice Regulations Eased

Wage-hour regulations affecting apprentices are being temporarily relaxed. This is to assure their continued employment after Jan. 25, the effective date of the 75-cent minimum wage and other amendments to the Fair Labor Standards Act.

Steel Payrolls Set Record

The payroll of the iron and steel industry in the first nine months of 1949 was higher than ever before in a like period, says the American Iron & Steel Institute. The estimated total of $1670 million in this period was $43 million higher than in the first nine months of 1948. September payrolls were $173,450,000.

During September, average hourly payments to wage earners rose to $1.712 an hour from $1.682 in August, and equaled the January level, the highest this year.

Wage earners worked an average of 36.8 hours a week in September, compared with 36.5 in August. The estimated employment for the entire industry in September was 600,200 or 2,900 less than in August.

Industry Races Motor

Drive to make up steel, coal strike losses will bolster economy for first quarter

INDUSTRY is racing its motor to make up strike losses. It looks now as if the supply-demand mechanism won't get overheated for the next two or three months.

Automakers will be going at full tilt after the holidays at a time which is normally slack. Ford's Buffalo assembly plant will operate overtime beginning Jan. 3. All other producers are driving for production early in the year. They figure to cash in on good demand early in the new year.

Steel Rate High—The steelmaking rate nears top capacity. Last week it held to the high level of 94.5 per cent reached the previous week. Since Oct. 31 when Bethlehem signed the pension agreement, the rate has recovered from 9 per cent of capacity.

Chicago buyers, surveyed by the Purchasing Agents Association there, are optimistic about business prospects for the first quarter of 1950. They think, though, that the steel and coal strikes will catch up with us eventually, perhaps before midyear. Part of the losses of steel from the strike have already been recovered, but not the lost wages and purchasing power.

Moderately Optimistic — Echoing these opinions is the Research Institute of America which surveyed its 30,000 members. Leo M. Cherne, executive secretary, says business now is on a plateau with the downtrend of 1949 ended for the next five to six months to come. The decline may be resumed in the second half of 1950.

Vacuum Cleaner Sales High

Factory sales of standard-size household vacuum cleaners in November were third highest of any month in 1949.

They totaled 253,516 units, compared to 309,897 in March, the top month, and 272,520 in October, the second best month. Figures are compiled by the Vacuum Cleaner Manufacturers' Association.

November sales compared to 255,080 units in the same month of 1948, a decrease of 0.6 per cent. November sales showed an increase of 136.6 per cent over sales in the same month of 1941. That year was the industry's best prewar period.

October Washer Sales Dip

Standard-size household washer factory sales in October came within 6.6 per cent of equaling the 11-month high achieved in the preceding month. American Home Laundry Manufacturers' Association totals show the October figure to be 333,728 units, compared with 357,281 in September. The association points out that the latest month's total was achieved despite the steel strike's effect on production.

Ironers sold in October aggregated 36,045 units or 30 per cent above 27,700 in September and 6.4 per cent less than the 38,517 sold in October, 1948.

Tool Orders Rise Sharply

New orders for machine tools jumped 27.5 points on the National Machine Tool Builders' Association index to 84.3 in November from 56.8 in the preceding month. The November figure is the second best in 1949 and bears out the predicted upswing in ordering following settlement of the steel strike. Foreign orders also gained to an index figure of 17.1 in November from 13.7 in October.

Shipments index moved up fractionally to 66 from 65.7 a month earlier. Ratio of unfilled orders to shipments declined to 3.7 to 1 in November, compared with 3.8 to 1 in October.

Association's indexes are based on average monthly shipments in 1945-1947 equaling 100. Average annual shipments in the base period were $355 million.

Follansbee Prospects Good

Business for the first six months of 1950 looks exceptionally good, says Marcus A. Follansbee, president, Follansbee Steel Corp., Pittsburgh, and the entire year is expected to shape up well compared with 1949.

Follansbee is booked through first half on cold-rolled sheets and through first quarter on specialties, including cold-rolled strip, roofing sheets and polished sheets. Silicon sheets are available for March delivery.

The company is concentrating all activities at Follansbee, W. Va., where it has facilities for production of 50,000 tons of silicon sheets, 12,000 tons of roofing sheets and 180,000 tons of cold-rolled sheet and strip products annually. These facilities have been expanded and modernized in the past few years. It also has a wholly-owned subsidiary at Follansbee, the Sheet Metal Specialty Co., which makes stampings and sheet metal products.

Follansbee formerly operated a plant at Toronto, O., with four open hearths, a bar and billet mill and auxiliary equipment. This plant will be sold soon.

Businesses Gain in South, West

The business population increased much more in the South and Far West than in other parts of the country between 1944 and 1949.

The Commerce Department's Office of Business Economics says that the number of firms in operation for the entire country increased by 30 per cent between early 1944 and early 1949, but there were wide regional variations. The increase in business population was largest—56 per cent—in the Far West, followed by the Southwest—46 per cent—and the Southeast—43 per cent. In New England, the Middle East, Central and Northwest regions, the business population increased less than average.

Florida, which had a 70-per cent rise, led all the states. Arizona was second and California third. The District of Columbia, Illinois and Missouri were at the bottom of the scale of increases.

Spur in Refunds and Bonds

Two factors will nudge the economy upward in the next year. In February veterans will begin to get $3 billion in payments on their insurance refunds. Savings bond maturity dates start coming thick and fast in 1950.

C. J. Devine & Co. Inc. estimates the $1 billion in Series D bonds sold in 1940 will come due in 1950, the first large volume of maturities since savings and war bonds were initiated. About $750 million of this will be cashed and available to consumers for appliances, automobiles and other purposes. A guess is that the other $250 million will be "rolled over" or reinvested in the current series of government savings bonds.

The treasury, incidentally, may start a drive to get people to reinvest their securities. The department seeks suggestions on how to handle the large maturities which begin in 1950, although Secretary of the Treasury John Snyder says refunding causes him "no concern."

In spite of prematurity redemptions, the government may have to refund as high as $9 billion on matured bonds in some years over the next decade.

As of Nov. 30, 1949, only 22.8 per cent of the Series D bonds sold in 1940 were redeemed before maturity. As of last Nov. 30, 42.7 per cent of all Series E bonds issued in 1942 had been redeemed; 50.3 per cent in 1943; 51.9 per cent in 1944; 50.5 per cent in 1945, 41.5 per cent in 1946; 32.8 per cent in 1947; 24.9 per cent in 1948; and 12.1 per cent in 1949. About $3.5 billion Series E bonds were sold in the first 11 months of 1949. This same rate of purchase will probably be continued in 1950.

U.S. Steel Shifts

Hood to Carnegie-Illinois. Cox goes to Kennecott. Jordan heads Steel & Wire

CHARLES R. COX, president of Carnegie-Illinois Steel Corp. since 1946, will become president of Kennecott Copper Corp., New York, Jan. 1.

Clifford F. Hood succeeds him as president of Carnegie-Illinois. Mr. Hood has been president of American Steel & Wire Co., another U. S. Steel subsidiary, since 1938.

New president of American Steel & Wire will be Harvey B. Jordan, vice president in charge of operations of the wire company since 1939.

James E. Lose, vice president-operations for Carnegie-Illinois, becomes executive vice president of that company.

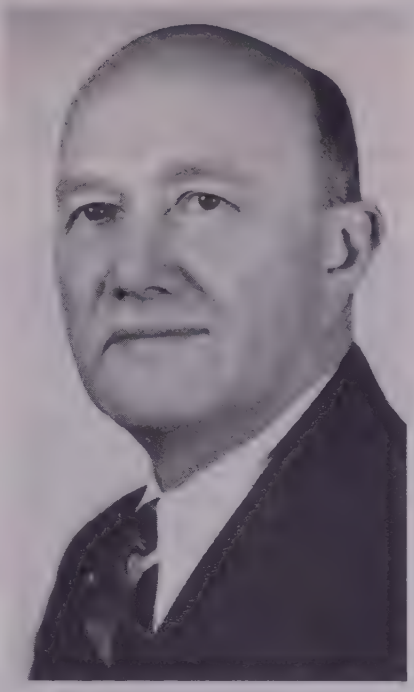
Mr. Cox assumes the presidency of the world's largest copper producing company. He succeeds E. T. Stannard who died in an airplane accident in Canada last fall. Before going to Carnegie-Illinois, Mr. Cox was president of National Tube Co.

Mr. Hood rose to the presidency of American Steel & Wire from an operating clerk, succeeding through various operating jobs.

Mr. Jordan has been with the wire company for 35 years in operating capacities.

The executive vice presidency of Carnegie-Illinois is a new office. Mr. Lose joined Carnegie Steel Co. in 1910, and like Messrs. Hood and Jordan, rose through the operating department.

HARVEY B. JORDAN
. . . to head American Steel & Wire



CLIFFORD F. HOOD
. . . becomes president of Carnegie-Illinois

Lukens To Close Big Mill

LUKENS Steel Co., Coatesville, Pa., will close down its 206-inch rolling mill for 90 days beginning Jan. 22 to expedite the change-over in this unit's power plant from steam to electric.

The $2 million electrification program calls for installation of twin motors of 4000 hp each. It is expected to increase the mill's capacity by 10 per cent for converting carbon and low alloy steel ingots into slabs or plates. A drastic reduction in cost of power for the mill will be made.

Steel Imports Still Small

ARE iron and steel imports gaining sufficiently in volume to have a disturbing effect on domestic production? To answer the question the Commerce Department made a special tabulation; it shows that imports through Sept. 30 were small as compared with domestic production. The study was made as a result of reports that European steel lately has been offered at delivered prices which are $5 to $10 a net ton below those charged for warehouse delivery in eastern seaboard centers.

The commerce figures show imports for the first nine months of 1949 under these headings: Plain shapes 111,701 tons; pig iron 77,847 tons; ingots, blooms, billets and slabs 41,074 tons; boiler and other plate 20,654 tons. They show further that these imports were concentrated largely in the first six months; the only exception was in ingots, blooms, billets and slabs, of which 26,061 tons were imported in the first six months and 15,013 tons in the third quarter.

This tabulation, with ports of entry and countries of origin, is for the first nine months of 1949. Figures are in net tons.

Customs Districts of Entry	
Philadelphia	69,102
New York	58,986
Galveston	49,133
Michigan	47,355
Maryland	29,727
Buffalo	22,941
Massachusetts	13,631
New Orleans	11,057
Mobile	10,280
Ohio	5,642
Chicago	20,069
Los Angeles	4,296
Countries of Origin	
Belgium-Luxemburg	163,536
Canada	95,703
India	23,078
Australia	19,601
Norway	13,080
Netherlands	12,235
Sweden	7,930
Austria	5,602
Germany	5,516
United Kingdom	2,503
France	7,762

Copper in Paste Form Developed

COPPER in paste form, providing savings in the assembly of parts for furnace copper brazing, has been developed by Metals Refining Co., Hammond, Ind. Metals Refining is a division of Glidden Co.

Called Cubond, the paste provides a source of copper that can be applied with speed and little waste

CHARLES R. COX
. . . goes to Kennecott Copper

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Excise taxes are one of the first things on the House Ways & Means Committee docket when it goes to work on its promise to revise taxes in January

PROMPTLY after Congress reconvenes, Jan. 3, the House Ways & Means Committee will go to work on its promise to initiate tax revision.

The start will be made on excise taxes; many of them, on the basis of assurances from Chairman Robert L. Doughton (Dem., N. C.), are to be repealed or reduced to encourage business in the commodities now taxed.

Although a wiping out or reduction in excise taxes is contemplated, the relief to be furnished depends on finding substitute sources of income, says Mr. Doughton. The relief promised comes to about $1 billion in tax income a year. The $64 question is: From what other sources can this amount be raised?

Present indications are that the contemplated loss in excise tax collections will be made up by slapping taxes on income that at present is tax-exempt. Rep. Noah M. Mason (Rep., Ill.), a member of the committee, will lead a drive to impose taxes on the income of co-operatives. He thinks exempting co-operatives from income taxation imposes an unfair disadvantage on competitive, tax-paying business firms. He believes the full amount lost through elimination and reduction of excise taxes can be recouped in one fell swoop by taxing co-operatives.

There is a possibility that the committee will give at least preliminary consideration to proposals to tax other tax-exempt income: Investments by churches, trusts and foundations. Co-operatives owned and conducted by farm and labor organizations may also be considered.

When the committee starts its deliberation in January, it will weigh these proposals:

Elimination of double taxation on corporate earnings, or a modification under which stockholders could deduct from their gross earnings a percentage (possibly 20 per cent, not to exceed $400) of the dividend dollars received. The latter proposal would benefit small stockholders principally.

Eliminating the present tax rate of 53 per cent on profits between $25,000 and $50,000 and substituting the 38 per cent combined normal and surtax now applying to profits above $50,000. The change is urged to answer the universal complaint that small business now is unable to retain enough earnings for capital and expansion purposes.

REP. ROBERT L. DOUGHTON
. . . seeks to revise excise taxes

Adoption of a provision for shortening the period over which new equipment purchases may be amortized. A number of pending bills call for a uniform 5-year period, but some members of the committee are thinking of a flexible arrangement under which the purchaser—with Treasury consent—would fix his own period for the charging off of depreciation.

Although the whole subject matter has been thoroughly explored—the tax proposals received by the committee during the 80th Congress fill five volumes—the group proposes to start from scratch with a new series of hearings. Those who appeared before the committee in 1947 and 1948 will be invited to tell their up-to-date stories early in 1950.

Chairman Doughton and other members of the tax-originating committee have said they are opposed to any major tax increases in 1950 even if President Truman should make such a request.

Where To Build New Plants

"ECONOMIC Aspects of Industrial Dispersion" is the title of a new booklet being prepared by the National Security Resources Board for distribution next spring.

It will treat of the security factors that manufacturers should bear in mind when planning and locating new plants. It will deal only with new construction because NSRB believes that moving existing facilities to new sites is not practicable or desirable.

Research Facility for Air Force

WORK is about to be started on the Air Force's Air Engineering Development Center, Camp Forrest, Tenn., on a fiscal 1950 appropriation of $8 million in cash and $24 million in contract authority.

It will be a research installation for development and evaluation of air weapons. Major equipment will include wind tunnels for aircraft testing, an altitude test chamber for jet engines and accessory facilities. Construction will be done by the Army Corps of Engineers; it organized a new Engineer District with permanent headquarters at Tullahoma, Tenn., for the assignment. Commandant of the new district is Col. David M. Dunne.

Oxygen, Wind To Be Utilized

TWO PROJECTS of interest to American industry were agreed on at the recent Paris conference of the OEEC (Office of European Economic Cooperation) Working Party on the Exchange of Technical and Scientific Information.

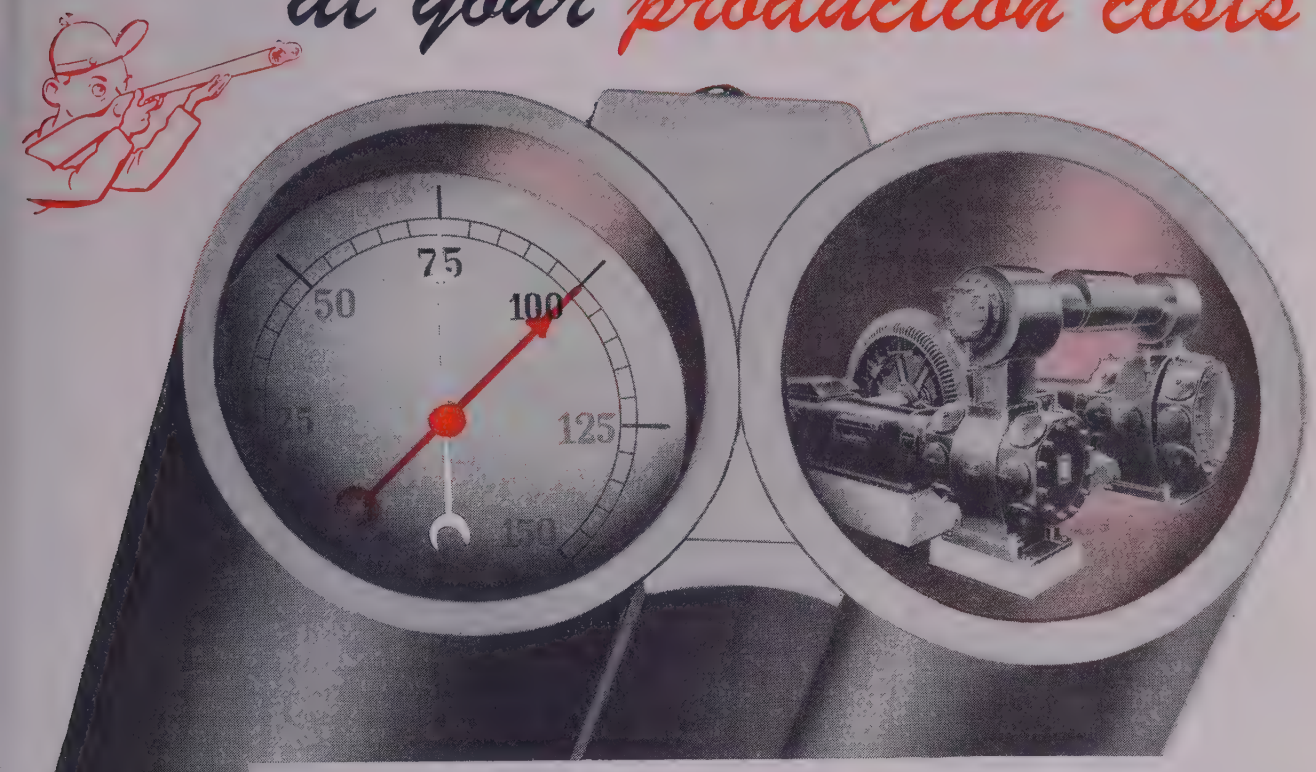
One involves the use of oxygen in steelmaking and other production processes; the other calls for the development of wind power in countries deficient in coal and in hydroelectric potentials. Both projects were classed as too big for complete coverage by any one nation. Co-operative committees to carry them out on an international basis now are being set up by the various Marshall Plan countries in the OEEC.

Public Hearings on Tariff Cuts

THE PLAN to consult with industry advisory committees on new tariff cuts to be negotiated with many countries late in 1950 has been abandoned by the State Department's Trade Agreements Committee.

Instead, the usual public hearings will be held so that all interested parties can express their views. The list of commodities on which the committee will entertain concessions is to

Fire this DOUBLE BARREL *at your production costs*



1 FULL AIR PRESSURE

Many plants are choking their production and their profits by operating Air Tools on insufficient air pressure. A seemingly small pressure drop of 10 pounds per square inch may cut a tool's productive power as much as 15 to 25%.

Industry is installing new and more Air Tools to reduce its production costs. Why not give these Air Tools a chance to give maximum performance? An I-R engineer will help you make a pressure check . . . at the tools. If it's low, perhaps just a change of piping will correct it . . . larger pipe, or more direct, or new feeder lines. Or possibly you may need more compressor capacity. . . at the main plant or at booster stations.

2 MODERN COMPRESSORS

If you need a new compressor, you will want the *best* Ingersoll-Rand's "PRE" synchronous-motor-driven compressor (shown above) is the kind of machine that any plant engineer would be happy to operate . . any company proud to own. These compressors are full of valuable features that you cannot buy in any other compressor ... features that save power, save maintenance. You can't afford to over-look the "PRE" in any modernization program.

"PRE" sizes range from 400 to 3000 horsepower, and if you need smaller compressors, or another type of drive, Ingersoll-Rand has it . . . whatever it is.

Ingersoll-Rand also builds a full line of Air Tools, Air Hoists, and Rock Drills for both production and maintenance work. And remember, Air-Power equipment pays for itself nearly twice as fast today.

AIR POWER ... The Key to Lower Production Costs

Ingersoll-Rand

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380-1

be prepared by interdepartmental committees that will examine our trade with each country and determine which of the principal commodities can stand a cut in tariffs without harm to American industry.

Expectations are that the list of commodities selected for possible concessions will be published by presidential proclamation in the spring of 1950 and that public hearings will be scheduled shortly thereafter. The hearings will be conducted by the Committee for Reciprocity Information of which Lynn R. Edminster, vice chairman of the Tariff Commission, is chairman. The committee has the same membership as the Trade Agreements Committee with this exception: Carl D. Corse, chief of the State Department's Commercial Policy Staff, is chairman of the latter committee.

Await FTC Decision

MANY INDUSTRIES await with keen interest the decision of the Federal Trade Commission on the proposal to fix a carload of 20,000 pounds as the maximum quantity of replacement rubber tires and tubes upon which quantity price differentials may be allowed.

It is the first time that the exercise of this power has been contemplated. If the proposal is adopted, similar quantity price differential limits may be proposed for many other commodities. FTC has set Jan. 19 as the final day for filing evidence, views and arguments in the tire and tube case.

Authority for the proceeding springs from the so-called quantity limit proviso of Section 2 (a) of the Robinson-Patman Act. It authorizes the commission to establish quantity limits on particular commodities and revise them when necessary "where it finds that available purchasers in greater quantities are so few as to render price differentials on account thereof unjustly discriminatory or promotive of monopoly."

New Breakdown on U.S. Spending

TO ENABLE it to answer quickly and accurately any question about how much money the U. S. government spends for this or that purpose, the Bureau of the Budget is setting up a new tabulation.

It will show at a glance how federal expenditures break down by categories. The tabulation will be in four parts:

Part 1 will show all loans and recoverable disbursements, by departments and agencies. Part 2 will list public investments, as in buildings, dams, strategic materials, etc., that have real and permanent value. Part 3 will show all aids and subsidies—to the merchant marine, navigation, farmers, veterans, foreign countries, etc. Part 4 will list operating expenses, including financing of the national debt, maintenance of defense and other costs of running the government. The aim is to break down the totals so that each item will be shown separately.

The new information, it is hoped, will be ready for use as an appendix to the annual budget report to be submitted to Congress in January. If not ready then it will be issued later as a special study of the Bureau of the Budget.

Patent Amendment Considered

MILITARY procurement policy officials are considering a proposed amendment to Section 9 of the Armed Services Procurement Regulation covering patent matters.

At present the holder of a contract classified as "secret" or "top secret" must obtain permission from the contracting officer before filing a patent application disclosing information pertinent to techniques involved in filling the contract. Some contractors have complained that under this clause the contracting officer may arbitrarily deny the contractor the right to file a patent application on an invention whose disclosure would not be harmful from a national security standpoint.

The proposed amendment would give the contractor the right to appeal the contracting officer's denial to the secretary of the particular service.

Stovepipe-Tentpole Combination

EQUIPMENT for use in the arctic regions continues to engage the attention of researchers in the Army Quartermaster Corps.

Latest development is a combination steel stovepipe and tentpole made in five nestable sections for transporting and storing. Its base section is a cleanout door; a conical shield at the top attaches to the tent fabric, along with a special sheet steel draft-diverter.

The stove with which it is used is a folding sheet steel box with adjustable legs, adaptable for burning liquid or solid fuels and capable of providing enough heat to keep occupants of the portable tent comfortable at extremely low temperatures.

Industrial Mobilization Planning Not in Discard

SEVERAL MANUFACTURERS asked STEEL recently if the Munitions Board's industry advisory setup for industrial mobilization planning is in the discard. They point out that very few conferences have been held with such committees in the latter part of 1949, and only one such meeting has been scheduled for early 1950.

The answer, according to Munitions Board spokesmen, is that these groups of manufacturers are vitally important. The board's policy is not to call in these busy men for meetings in Washington unless real problems require discussions with the industrialists. Although few such group meetings are held, the 25 committees and 42 subcommittees fill a pressing need. Not a day goes by without the board telephoning or writing to members of these committees and subcommittees to obtain information in connections with the industrial mobilization planning task.

Besides making such current use of the industry advisory committees, the board plans to rely heavily on them in the actual mobilization of industry in event of another M-Day. In another war they would be called in to help on the drafting of the many production, conservation, ceiling price and other orders that would be required to evolve a war economy. And they would furnish the men to administer the application of these orders.

By a recent decision, the Munitions Board — not the National Security Resources Board—is responsible for industrial mobilization. NSRB originally did contemplate shouldering the responsibility. At the start of an emergency, the Munitions Board is to come up with a full-fledged counterpart of the War Production Board, Office of Price Administration, War Manpower Commission, etc., of World War II, and would administer this setup until such time as Congress acted to create a civilian agency to take over these functions.

You can see that the industry advisory committees of the Munitions Board are identified with the right agency for industrial mobilization planning.

Members of all of these groups should feel assured that, even though they are not called into meetings very frequently these days, they are a vital part of the defense planning organization and will be called into key roles in the event of future need.

4 Million TV Sets in '50

That many may be produced when you take a look at the present sales outlook

THE STORY of television's growth n terms of dollar sales and employment is told by statistics just put together by the Radio Manufacturers' Association, Washington.

At the end of the war there were 0,000 sets in operation in the U. S. n 1946, 6500 television receiving ets were produced. In 1947 production was 175,000 sets, in 1948 975,000 ets. In 1949, according to estimates, production will be about 2.6 million ets. Production in 1950, on the basis f present sales outlook, should be omewhere between 3.5 million and million sets.

Dollarwise, 1949 production is ringing manufacturers about $551 nillion—figured on an average factory price of $212. It is bringing lealers approximately $884 million—t an average retail selling price of 340. The price story makes graphic vhat happens when a new industry ets rolling in mass production. In 948 the average factory price was 235, the average retail price $378. n 1946 the average retail price was bout $450; in 1947 it was about 400.

The industry has about 125,000 irectly working in the production of elevision sets. The distributing, retailing and servicing organization omes to another 100,000 employees. t does not include thousands of announcers, cameramen, technicians, actors and others employed by broadcasting stations, nor the large number of workers indirectly employed in servicing the industry.

Sales prospects are brilliant for the latest offshoot of the radio waves. The 60 per cent of the country's population in areas that are reached by television broadcasts has purchased sets equivalent to only 12% of the expected saturation point. That leaves 88 per cent of existing sales prospects still to be exploited. An enormous additional market will be opened when the Federal Communications Commission ends the freeze on new station construction which it instituted in September, 1948, pending a decision about opening ultra high frequencies to television. Another big fillip to sales is expected when FCC, probably sometime in 1950, decides to permit color television.

WESTINGHOUSE ELECTRIC CORP.'S SUNBURY, PA., TV PLANT
. . . about 1500 separate operations in sight and sound for homes

TV Sales Surge in Los Angeles

UPSURGE in television sales in Los Angeles is assuming boom proportions.

Video manufacturers there are operating at capacity: A record 37,800 sets of all makes were sold in October. That's a 300 per cent increase in volume over the same month last year.

At an average cost of $275 per receiver, October purchases represent a consumer investment of more than $10 million. And that's fully a third of the amount spent for new passenger automobiles in Los Angeles County during that month.

CALENDAR OF MEETINGS

Dec. 26-31, American Association for the Advancement of Science: Meeting, New York. Association headquarters are at 1515 Massachusetts Ave., Washington.

Jan. 9-13, Society of Automotive Engineers: Annual meeting and engineering display, Hotel Book-Cadillac, Detroit. Society headquarters are at 29 W. 39th St., New York.

Jan. 10-11, American Home Laundry Manufacturers' Association: Fourth national home laundry conference, in Chicago.

Jan. 10-12, Conference on Industrial and Safety Problems of Nuclear Technology: Sponsored by New York University and Atomic Energy Commission, at New York University, Washington Sq., New York.

Jan. 10-12, Society of the Plastics Industry: Reinforced plastics division meeting and fifth annual technical session, Hotel Cleveland, Cleveland. Society headquarters are at 295 Madison Ave., New York.

Jan. 12-13, Southern Supply & Machinery Distributors' Association: Industrial distribution forum and midyear meeting, Edgewater Gulf Hotel, Biloxi, Miss.

Jan. 15-19, Associated Equipment Distributors: Annual meeting, Stevens Hotel, Chicago. Group's headquarters are at 360 N. Michigan Ave., Chicago.

Jan. 16-18, Truck-Trailer Manufacturers Association: Meeting, Edgewater Gulf Hotel, Edgewater Park, Miss. Association headquarters are at 809 National Press Bldg., Washington.

Jan. 16-19, Plant Maintenance Show: Sponsored by American Society of Mechanical Engineers and Society for the Advancement of Management, at the Public Auditorium, Cleveland. Mechanical Engineers' headquarters are at 29 W. 39th St., New York.

Jan. 18-20, American Management Association: Conference on management problems, in San Francisco. Association headquarters are at 330 W. 42nd St., New York.

Jan. 18-20, American Society of Civil Engineers: Annual meeting, Hotel Commodore, New York. Society headquarters are at 33 W. 39th St., New York.

Jan. 19, American Iron & Steel Institute: Regional technical meeting, Hotel Statler, Buffalo. This meeting originally was scheduled for last Sept. 29, but had to be postponed because of the impending steel strike.

Jan. 22-24, Institute of Scrap Iron & Steel Inc.: Annual convention, Hotel Statler, Washington. Institute headquarters are in the Dupont Circle Bldg., Washington.

Jan. 23-24, Industrial Furnace Manufacturers Association: Meeting, Dearborn Inn, Dearborn, Mich. Association headquarters are at 420 Lexington Ave., New York.

Jan. 23-27, American Society of Heating & Ventilating Engineers: Southwest air conditioning exposition, State Fair Park, Dallas. Society headquarters are at 480 Lexington Ave., New York.

Jan. 30-Feb. 1, American Material Handling Society, Chicago Chapter: Midwest material handling conference, in conjunction with Illinois Institute of Technology, in Chicago.

Feb. 2-3, Electric Maintenance Engineers of Milwaukee: 11th annual industrial electrical equipment exposition, at the Public Service Bldg., Milwaukee.

Feb. 9-10, American Foundrymen's Society, Wisconsin Chapter: 13th annual foundry conference, in Milwaukee. Chapter headquarters are at 610 W. Michigan St., Milwaukee.

Feb. 12-16, American Institute of Mining & Metallurgical Engineers: General meeting, Hotel Statler, New York. Institute headquarters are at 29 W. 39th St., New York.

Feb. 13-14, Society of the Plastics Industry (Canada): Canadian annual meeting, Royal York Hotel, Toronto, Ont. The Canadian segment of the society is associated with the American society whose headquarters are at 295 Madison Ave., New York.

EUROPE . . Distribution, Not Output, Major Problem in 1950

European and British businessmen hope devaluation will unlock markets. Economic unions may provide partial answer. Production should reach ECA goals by 1952

EUROPEAN and British businessmen, working on a giant economic jigsaw puzzle, swear some of the pieces are missing.

They're gambling that devaluation will prove the elusive, key part in 1950 to solve the problem. At least currency adjustments may go far toward clarifying the half-finished picture whose alarming dark spots and jarring colors now hint at poor integration. Back in the early days of the ECA, many thought a pleasant, prosperous scene would develop.

Better Distribution Needed—The disturbing thing is this: Production-wise, the ECA goal for 1952 will be largely achieved by all ERP nations except Italy, but still there are troubles. Western Europe hit the buyers' market in 1949. Her problem for 1950 is distribution, not output.

The matter is also complicated by the fact that distribution anywhere won't do. A proportionately greater volume of production must go to countries with hard money—the U. S., Canada, Belgium-Luxemburg and a few others.

Devaluation is one way to lure buyers with hard money. But what about all those buyers with soft money? Is that market to go awasting? A United States of Western Europe—with no tariff walls, no compartmentized industries—could conceivably usher in an era of economic expansion similar to that in the U. S. A. But there's no use dreaming. That won't happen in 1950 or for many years to come.

Economic Unions as a Compromise—A compromise approach is in small area economic unions. The only practical one thus far is Benelux, but even it has troubles. Unemployment is rising. The Netherlands is a misfit in the trio with Belgium and Luxemburg because it is less industrialized than the others. Other unions are being considered. Uniscan would include the United Kingdom and the Scandinavian nations of Norway, Sweden and Denmark. Members of Fritalux would be France, Italy, Belgium, the Netherlands and Luxemburg.

Still another alternative is to foster a mass production economy similar to America's within one nation. Western Germany has the best chance to do this. It has a population of 50 million starved for consumer goods, an industrial plant adaptable to assembly line output and technological know-how. A Uniscan or Fritalux would have the population to support such an economy, but the varying levels of living from country to country would preclude a market for standardized products.

Distribution in Europe is largely state-controlled except in Belgium-Luxemburg. The issue of statism will get unusual attention early this year when Britons go to the polls. They'll decide whether to keep the Labor government and its socialization schemes. Even if the Conservatives win, could they return to private enterprise those industries like coal, power and railroads that are already nationalized?

Output High in 1949—Production-wise, Europe did well in 1949 and should continue to do so in 1950. Shortages remain, particularly in steel sheets and strip, but they are disappearing rapidly. The output of steel ingots and castings in Europe, including Great Britain but excluding Russia, was about 57,880,000 net tons in 1949. With a Russian output for the year of about 20 million tons and that of the Soviet zone of Germany at 250,000 tons, the output for all of Europe was about 78 million tons. This is a 14.5 per cent increase over the 63,338,500 tons produced by mills in 1948.

The ERP nations made 50,920,000 tons in 1949, compared with 43,567,77[illegible] tons in 1948, an increase of almost 17 per cent. ECA's target for steel production for fiscal 1948-49 was 50,030,000 tons.

The most spectacular advance was made by Western Germany which produced 10.2 million tons in 1949, a 66 per cent gain over the 6,124,916 tons in 1948. French output advanced 24 per cent. Great Britain's increase of 4.25 per cent was better than it looks because a tremendous gain had been made in 1948 over 1947. Belgium, Luxemburg and Italy did not increase their steel production over the 1948 level.

Overproduction in Steel?—Many Europeans are alarmed at the danger of overproduction in steel, particularly when they take a look at the iron and steel expansion programs in the planning stages. The ERP nations have submitted their plans for future steel modernization and expansion to the Organization for European Economic Cooperation. If they all go through, $3.1 billion would be spent. About $400 million worth of equipment would be bought in the U. S.

The accompanying chart shows the major programs. In Britain's $1 billion program, about $70 million worth of equipment would come from the U. S. The $600 million French program involves imports of equipment totaling $117 million. The Benelux program with a total estimated cost of $380 million requires equipment imports of $150 million. More than half of the equipment bought in the U. S. would be rolling mills, principally for production of sheets and tin plate. Western Germany would also be a source for some of the large machinery.

Domestic Use May Rise—The ex

pansion program is based on the assumption that domestic consumption of steel will rise from the 36.7 million tons used before the war to 42.5 million tons in 1952-53. Total exports are estimated at 11 million tons in 1952-53. Of this total, about 7,260,000 tons would go to countries not participating in ERP. Europeans doubt now that this export goal can be reached. Industrial self-sufficiency is too popular a slogan in nearly every area of the world.

STEEL's series on the economic pasts, presents and futures of the major Western European countries is concluded here with a summary of the general situation. On Dec. 5 we wrote about Italy and Sweden, on Dec. 12 about France and Belgium-Luxemburg, on Dec. 19 about Britain and Western Germany. Complete iron and steel statistics for all industrial nations of the world will be carried in the 1950 Metalworking Yearbook issue, Jan. 2.

Metallurgical research is increasing, particularly in Great Britain, Belgium and France. The French have evolved a system of research which is being widely copied. Central development facilities are being established for all the major industries in France. They are supported by company subscriptions or production levies. The research results are available to all the individual firms participating. The private company may also have its own research facilities if it wishes.

Everybody in the Same Boat—Every country in Western Europe is plagued, in varying degrees, by the same trouble—dollar shortages. Britons are the worse off because their economy is so firmly hitched to exports. Belgians are in a spot complicated by their relative prosperity. Their money is so good that neighbors can't afford to deal with them. Although still partly immobilized by war wounds, the French are potentially well off. They have an economy nicely balanced between industry and agriculture. They have been generously endowed with natural resources.

With 1952 just around the corner, Western Europe is seething with conferences to decide what to do when Marshall Plan aid ends. Is devaluation the answer? In 1950 the ERP nations will discover if it fits into the economic jigsaw puzzle.

Italy Expands Steam Power

A project to install an additional 50,000 kw of steam generating capacity at the Genoa plant of Societa Edison to help ease the power shortage in Italy has been approved by ECA.

Cost of the project will be about $8.4 million, including $6,169,000 in ECA assistance funds for the purchase of a turbo-generator, boilers and accessory equipment. Shortage of power is a major limiting factor in Italy's recovery program. It is limiting many industries' operations. The drought has caused much of the shortage. This project is part of a program to bring Italian hydro and steam capacity into better balance.

Last April, ECA approved a $6 million authorization for a 50,000 kw addition to the same plant.

El Salvador Gets Loan

International Bank for Reconstruction and Development has granted a $12,545,000 loan to the Lempa River Hydroelectric Commission, a government agency in El Salvador. The loan will be used to finance imports of equipment and materials required for the development of electric power resources on the Lempa river.

Foreign Business Tips

Do you want foreign business?

"Tips on Trade with Marshall Plan Countries," a 46-page brochure written by E. K. Gubin, Washington administrative lawyer, has been published by National Association of Manufacturers as a service to the public and business. The booklet explains how to go about getting orders financed with ECA funds, discusses the future of ECA-financed business and lists the forms of ECA assistance available to small business. Half of the brochure is devoted to descriptions of procedures used by ECA countries in making purchases, and of the products they may buy.

ECA's Office of Small Business now is providing American small business firms with a complete program of Marshall Plan business information on Austria. Just issued is a list of Austrian importers who have purchased commodities financed under the Marshall Plan and a list of firms seeking bids on construction equipment and machine tools, before June 30, 1950. For complete information contact the Office of Small Business, ECA, Room 415, 800 Connecticut Ave., N. W., Washington, D. C.

OLD AND NEW: Side by side, crude oil and peat await shipment at Schoonebeek, Holland. Since the end of German occupation, oilmen in the Schoonebeek field on the Netherlands-German border have raised their crude oil production from 40,000 bbl to a little more than 40 mililon bbl each year —the largest production in Western Europe. During the war, the Dutch sabotaged the German war effort by making only two wells productive out of 60. Today 75 producing wells have been completed for Netherlands Oil Co.

Canada Steel Prices Steady

Canadian steel producers will not raise their prices for the present even though controls over mill and wholesale quotations for primary iron and steel products were lifted Dec. 1. Controls remain on steel scrap prices.

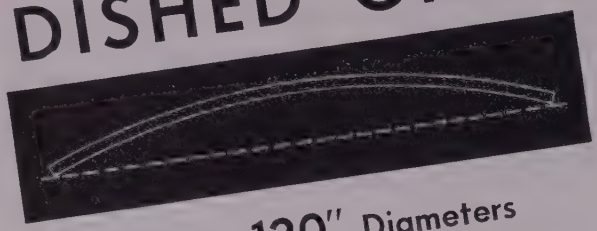
Under existing prices, Canadian producers have an edge on U. S. exporters shipping into Canada. Besides the higher freight rates from the U. S., there is the additional 10 per cent charge due to the Canadian dollar devaluation.

Another factor that discourages any price boosts is British steel quotations. More dominion consumers will switch to U. K. suppliers if Canadian steel goes up.

Steel production is near capacity in Canada. Mills now are almost solidly booked to the end of the first quarter on many products.

Stainless & Mild Steel HEADS

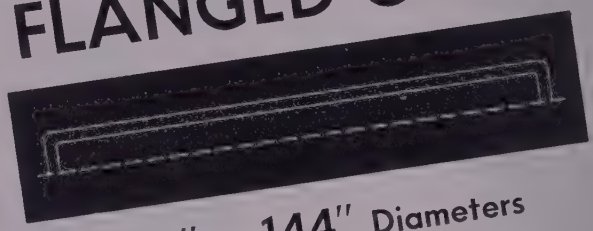
DISHED ONLY



12″ to 120″ Diameters

MILD STEEL—⅛″ to ⅝″ in Thickness.
STAINLESS—⅛″ to ⅜″ in Thickness.

FLANGED ONLY

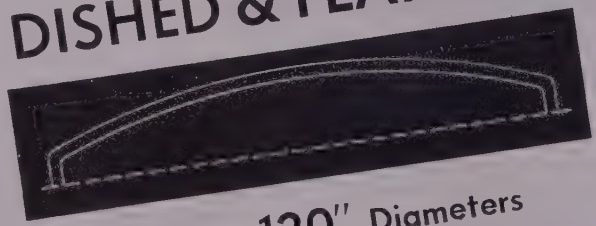


24″ to 144″ Diameters

MILD STEEL—¼″ to 1″ in Thickness.
STAINLESS—3/16″ to ¾″ in Thickness.

PRICES ON REQUEST

DISHED & FLANGED



24″ to 120″ Diameters

MILD STEEL—¼″ to ⅝″ in Thickness
STAINLESS—3/16″ to ⅜″ in Thickness.

ALSO HEADS DISHED AND FLARED

CYLINDERS ROLLED AND FLANGED

E. McCABE & CO.

9 WATER STREET LAWRENCE, MASS.

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Chrysler spends $23 million in changes for 1950 passenger cars. Plant capacity raised to 7100 daily, against 6400 at beginning of year. New models to be shown soon

DETROIT

CHANGES in its 1950 lines of passenger cars cost Chrysler Corp. $23 million, comparing with expenditure of $90 million for the 1949 series. An effort has been made to differentiate more noticeably between the four groups of cars, but basically a lot of similarity remains, doubtless in the interests of cost saving. Plant capacity has been boosted to 7100 per day, against 6400 earlier this year, and the corporation has every hope of reaching the new figure probably by February or March. By the end of this month about 50,000 of the models will have been fed to dealers who will display them early in January.

Attempts have been made to achieve a lower silhouette, chiefly by treatment of decorative moldings and by elongating and raising rear fenders. Rear tread has been increased 2½ inches to improve stability and reduce tire loads on turning. Rear windows have been enlarged by 33 per cent for better vision, especially at the rear quarter. Brakes have been increased in diameter from 11 to 12 inches on DeSoto and Chrysler, giving 15 per cent more effective lining area. Disk-type brakes continue to be limited to the Chrysler Crown Imperial model.

Separate Grille Sections—Interesting feature of the new grille is that it is comprised of eight separate sections, any one of which may be replaced without disturbing the others. This should greatly reduce the cost of grille maintenance which has been a rough deal on some cars, often running as high as $75-$90 where the entire section must be replaced.

Chrysler, Dodge and DeSoto will introduce special club coupes which are essentially convertible chassis and bodies with rigid steel roofs. They resemble similar coupes which General Motors has introduced on Cadillac, Oldsmobile and Buick, and will have next year on Pontiac and Chevrolet. Chrysler will call its version the Newport, Dodge the Diplomat, and DeSoto the Sportsman.

Commenting on Chrysler styling for 1949 and 1950, K. T. Keller, president, said, "The fact that more people bought our cars in 1949 than in any other year in our history seems pretty good proof to us that people like what we are doing. It seems clear evidence that they want cars built to serve them conveniently and comfortably and at low cost to maintain, that they want cars easy to get into and out of, that they want cars you can sit in naturally and which can be maneuvered and handled easily, with that minimum of effort which in itself is such an important element of safe driving."

May Set Up Proving Grounds — Hints that Chrysler may be planning to set up a large proving grounds near Chelsea, Mich., have been dropped by farmers in the area who have been mystified over recent months by the quiet acquisition of 4000 acres of property by a Detroit real estate broker, at a reported cost of $500,000. No explanation has been offered by the purchaser, except that the use of the land will be "in the public interest." Request to close six miles of unimproved roads through the site are awaiting approval. A local hawkshaw said he had seen Chrysler company cars entering the area, carrying officials whom he recognized.

Chrysler has never operated extensive proving ground facilities such as those maintained by General Motors at Milford, Mich., or by Ford in Dearborn. With the increasing emphasis being placed on research and testing, as exemplified by the vast new technical centers being erected by both GM and Ford, it may be that Chrysler has decided to break out of the Detroit area and go in for a major proving grounds in a big way, perhaps combining with it expanded research and engineering plants. The village of Chelsea is about 15 miles west of Ann Arbor, bordering on a dense network of small lakes.

Automobile Production

U. S. and Canada

Passenger Cars and Trucks—

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,966
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	678,092	478,186
September	657,078	437,181
October	601,021	516,814
November	456,320*	495,488
December		514,337
12 mos.		5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Dec. 3	72,994	125,170
Dec. 10	52,514	124,041
Dec. 17	86,624	123,315
Dec. 24	100,000	94,868

Estimates by Ward's Automotive Reports

New Military Jeep

WILLYS-OVERLAND has submitted the first pilot model of a new military Jeep for inspection by Army Ordnance officials at the Detroit Arsenal. Among unusual features is a deep-fording arrangement which permits the vehicle to be operated even when its engine is completely submerged. Previous Jeeps could accomplish this only by being fitted with a special deep-fording conversion kit.

For quick service and replacement in the field, the design contains provision for removal of the engine, radiator, transmission and transfer case as a complete unit, without even draining the engine. It has a high-voltage electrical system, special provision for quick starting in extremely cold weather, mounting brackets for military equipment and other refinements developed for the postwar civilian Jeep. Six pilot models will be delivered shortly after Jan. 1 for 60 days of tests and proving. Upon final o.k. the company will launch manufacture of the vehicles under a contract calling for 4000.

Reo Builds Army Truck

MEANWHILE, up at Lansing, Mich., U. S., British and Canadian military brass recently witnessed the unveiling of a completely new army vehicle—a 2½ ton truck built by Reo Motors Inc. In addition to numer-

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ous advances in truck design and performance the transport vehicle—currently known as the M-34, 2½-ton, 6 x 6—is reported to cut spare parts requirements by one-third. Production is slated to begin in March on an order for about 5000 units, plus parts, costing better than $30 million.

1950 Trucks in Production

CHEVROLET trucks for 1950 hit assembly lines about a week in advance of the first new passenger cars. The line comprises 20 series on nine wheelbases, with many improvements aimed to contribute to driver safety and comfort. Two sizes of engines are available, with slightly increased horsepower — 92 and 105, respectively. The boost was accomplished by larger inlet, exhaust and manifold passages and redesigned carburetors. Other revisions are in shock absorbers, heavier front springs, seat cushions, steering knuckles and larger spindle diameter on front axles.

Chevrolet Plugs "Powerglide"

PUBLICISTS for Chevrolet have mailed to the press a couple of "teasers" evidently calculated to whet interest in the forthcoming "Powerglide" automatic transmission. One was a medallion embossed with a human foot, accompanied by the citation, "for distinguished service."

Following that was a diminutive replica of a mattress to which was attached the advice, "now you can give that left foot a rest." It took a little deep analysis but it finally came: Chevrolet was presenting the distinguished service award to the human left foot which can now be retired on pension since there is no clutch pedal to operate in connection with the 1950 model's automatic transmission.

Horsepower Upped in GMC Trucks

GMC Truck & Coach Division of General Motors is presenting its 1950 line of commercial vehicles, featuring stepped-up horsepower, new models in the 1½ and 2½-ton types, two new six-wheelers in the 24,000-32,000 lb gross vehicle weight range, and two new lighter diesel-tractor series of 45,000 and 55,000 lb combination weights. Horsepower of three engines for the light-medium group of trucks boast higher horsepower by virtue of redesigning the intake manifold, installing high-lift cams, enlarging the carburetor throat, changing the valve timing and the angle of the exhaust valve seats.

In GMC's large diesel series, weight savings range from 1200 to 2500 lb. They have been effected by such things as aluminum auxiliary transmission cases, aluminum rear axle housings, brake shoes and hubs, heat treated light-weight frames, aluminum wheels, and lighter springs and axles.

Enters Van Body Field

BY ACQUIRING assets of the Capitol Body Co., Indianapolis, the Mid-West Body & Mfg. Division of Electrographis Corp., Paris, Ill., has entered the van body field, rounding out its line of farm and stake trucks, 30,000 of which have been produced since 1946. Machinery, tools and fixtures of the Capitol company have been moved to the Illinois plant and an all-steel, all-welded van body of engineered design introduced, capable of being built in any length, width, height or size, based on a production system that permits each body to be custom constructed while at the same time realizing the economies of mass production.

No bolts or rivets are used in building the body. Exterior sheet panels are welded to steel struts and by the use of formed steel sections the body has been strengthened at eight points. The bodies are carried on all-steel longitudinal sills, adapted for universal mounting. The entire body is fabricated into one solid steel structure by welding each component, even the sidewalls being welded to the platform sections. However, it is claimed that panels can be replaced easily in event of damage.

Buick Offers New Body Styles

A FLOCK of new body styles will greet the public in Buick's new Super and Roadmaster. Of particular interest are two four-door sedans with 4 inches extra wheelbase and special types of bodies providing greater rear compartment room and additional rear-quarter side windows. These windows, together with a backlight which is carried well around into the quarter panel, result in a 41 per cent decrease in the rear-quarter blind spot. Buick calls these new creations of Fisher Body "tourback" sedans.

The full Buick line will include seven types in the Special series, six in the Super series on two wheelbases, six in the Roadmaster series on two wheelbases, not to mention three sizes of engines and with dynaflow transmission being optional on all except the Roadmaster. Thus you can put together about 35 combinations, without giving any consideration to color or many optional extras. Small wonder the division feels it is in excellent shape to whack right across the medium and high-price classes of buyers and maybe wind up next year by nosing out Plymouth for fourth place in sales.

Expands Parts Reconditioning

FORD has initiated a program to expand low-cost parts reconditioning service throughout the country by 60 independent companies authorized to do the work under strict quality standards. They will be assisted with merchandising and advertising problems and technical advice provided on manufacturing operations. These companies employ about 5000 in more than 30 areas over the country, have capital investment upward of $10 million and do annual gross business of $30 million. Authorized reconditioners handled 308,000 engines during 1948.

Packard Has Second Best Year

PACKARD closed out the year with shipments of 105,093, suspending Dec. 15 for plantwide yearend inventory and scheduling reopening of manufacturing starting Jan. 3. Total output compares with 98,898 produced last year, and was second only to the 109,654 units built in 1937. The company's automatic transmission division will continue working through the inventory closing.

Studebaker Expands, Modernizes

STUDEBAKER Corp., South Bend, Ind., has started work on a $836,300 construction program.

The first step is erection of an enclosed and heated loading dock at the end of one of the passenger car subassembly buildings. A one-story building housing motor manufacturing will be enlarged by additions to both ends for a total floor area of 520,000 sq ft, or 15 per cent more than at present.

Another project will add 30,000 sq ft of storage space for steel supplies to the new stamping division.

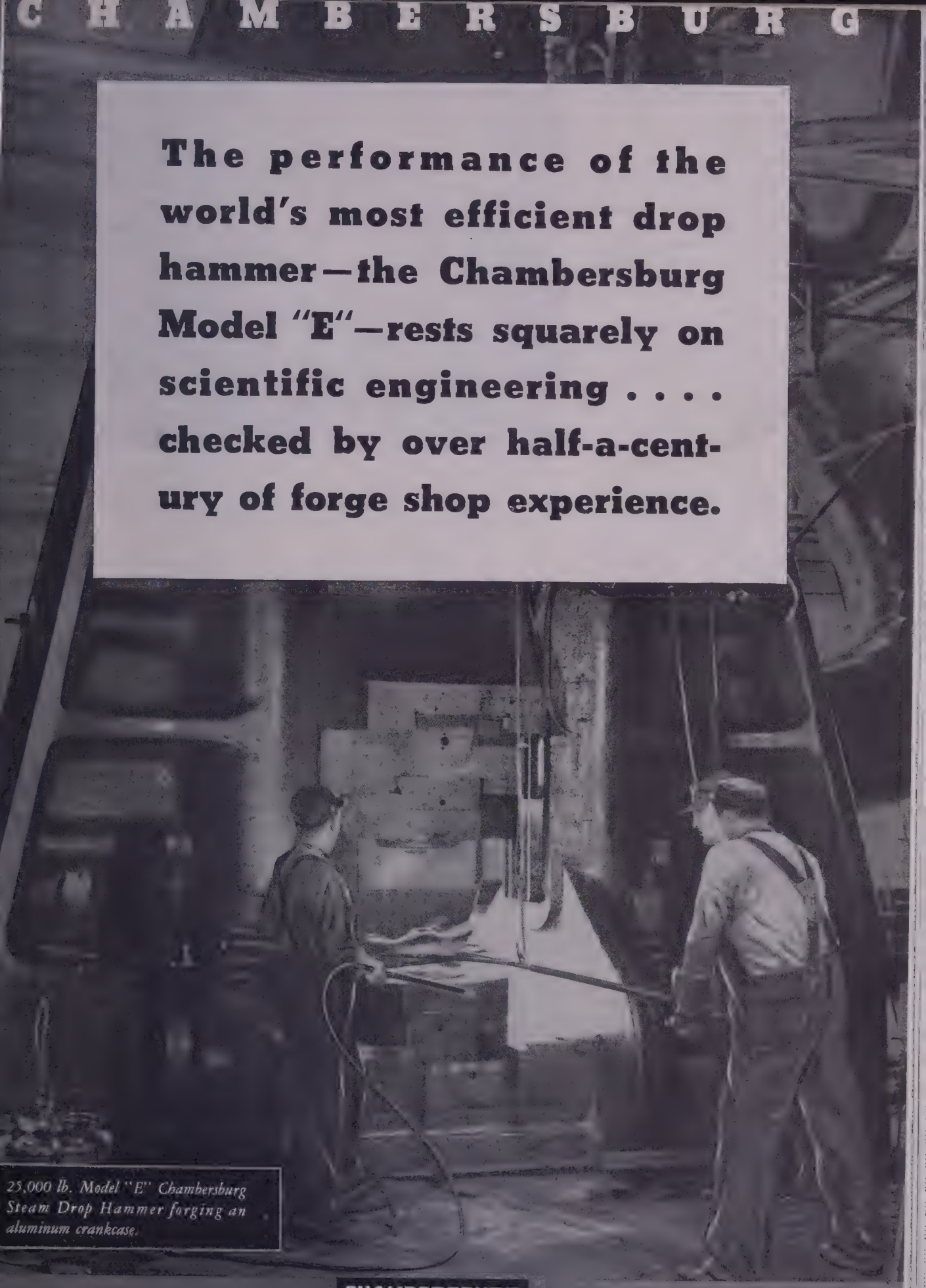
All this construction is scheduled to be completed by May 1.

Nash Coast Assemblies Stop

STEEL shortages have forced a shutdown of the El Segundo, Calif., Nash assembly plant of Nash-Kelvinator Corp. Inability of suppliers to obtain metal for components halted the flow of subassemblies. The plant hopes to resume production Jan. 3.

C H A M B E R S B U R G

The performance of the world's most efficient drop hammer—the Chambersburg Model "E"—rests squarely on scientific engineering . . . . checked by over half-a-century of forge shop experience.



25,000 lb. Model "E" Chambersburg Steam Drop Hammer forging an aluminum crankcase.

CHAMBERSBURG ENGINEERING CO.

CHAMBERSBURG
Builders of IMPACT Machinery

CHAMBERSBURG, PA.

J & L Steel Barrel

Signs ageement to buy Fruehauf Trailer Co.'s plant. J & L will consolidate Chicago operations

AGREEMENTS were signed by J & L Steel Barrel Co., wholly owned subsidiary of Jones & Laughlin Steel Corp., Pittsburgh, Pa., and Fruehauf Trailer Co., for the sale of Fruehauf's plant on Chrysler Rd. in Kansas City, Kans.

F. T. Barton, president of J & L Steel Barrel, says the acquisition is necessary to accommodate the consolidation of present operations in North Kansas City and pail manufacturing facilities in Chicago. The pail facilities were purchased from American Can Co.

Site of J & L Steel Barrel's operations in North Kansas City has been sold. The company announced (STEEL, Dec. 19, p. 48) purchase of the pail and galvanized ware business of American Can Co. now carried on in Toledo, Atlanta, Chicago and Jersey City, N. J.

Mr. Barton says J & L Steel Barrel will consolidate its Chicago line with the North Kansas City operation on the Fruehauf property. The pail line in Jersey City will be consolidated with operations of J & L Steel Barrel in Bayonne, N. J. Operations at Toledo and Atlanta will be continued on the properties that were purchased by the company.

New Mill for Thomas Steel Co.

THOMAS STEEL Co., Warren, O. awarded F. H. McGraw & Co., New York, a construction contract for a mill modernization program that is already underway. The McGraw work will consist mostly of erecting a three-stand tamdem cold reduction mill and making necessary building changes.

The construction project is McGraw's second for Thomas in the last two years. It will be completed in about five months.

Mechanical equipment for the new mill will be supplied by United Engineering & Foundry Co., Pittsburgh. Westinghouse Electric Corp., Pittsburgh, will supply the main mill drives. General Electric Co., Schenectady, N. Y., will provide auxiliary electrical equipment.

Dresser Headquarters To Move

HEADQUARTERS of Dresser Industries will be moved from Cleveland to Dallas about next April or May.

H. N. Mallon, president of the company, says the move will place the headquarters' staff of the company in closer contact with the mid-continent oil producing area which offers the biggest market for Dresser's principal products, oil field equipment.

Some 30 to 50 staff executives will be affected by the move, Mr. Mallon says, but no changes are planned in operations of the 11 firms that make up the company.

Dresser headquarters have been in Cleveland for the last four and half years. They were moved from Bradford, Pa., original home of the company.

LABOR COSTS TAMPED DOWN: This Jackson Electrical Multiple Tamper takes the place of a dozen workmen in tamping down the ballast under railroad ties; only two men operate it. The hydraulic tampers are operated by one man, and movement of car from one tie to another is controlled by another operator

A New Name: Alcoa Closures

ALCOA CLOSURES will be the new name of aluminum caps and seals produced by Aluminum Co. of America's wholly owned subsidiary, Aluminum Seal Co. Inc., Richmond, Ind.

The decision to change the name from "Alseco" to "Alcoa Closures" was announced by the parent company in Pittsburgh. Standard and specialty caps and seals will continue to be marketed through Alcoa's 55 sales offices as have "Alseco" seals in the past.

Laboratories To Be Integrated

TWO scientific laboratories—United States Testing Co. Inc. and Esselen Research Corp.—will be integrated.

Allen L. Brassell, president of United States Testing, and Dr. Gustavus J. Esselen, president of Esselen, announce jointly that beginning Jan. 1, 1950, Esselen will be the Esselen Research Division of United States Testing Co. Inc. Esselen will continue its operations in Boston where it was founded by Dr. Esselen. United States Testing is in Hoboken, N. J.

To Make Self-Locking Nuts

ILLINOIS Tool Works, Elgin, Ill., secured an exclusive license from Boots Aircraft Nut Corp., Stamford, Conn., to manufacture and sell its "Tri-Lok" and "Hex-Lok" self-locking nuts.

Harold Byron Smith, president of Illinois Tool, says the two lines of nuts will be added to the company's Shakeproof fastening line. "Although Hex-Lok has been used principally in the aircraft industry in the past," says Mr. Smith, "we now plan to offer it for general industrial use."

Col. N. Jay Boots, president of the licensing Co., says the Boots company will continue to supply the aircraft industry.

Keeping Up with the Times

HERE'S a story of a practical approach by industry to help school curricula keep abreast of major changes in industry:

Carboloy Co. Inc., Detroit, is making available a course specifically designed for educational institutions that will cover design, selection, use and maintenance of cemented carbide tools.

Briefs . . . .

Penn-Ohio Steel Corp., Birdsboro, Pa., bought Helms Industrial Development Co. of Grand Rapids, Mich., in an all cash transaction; the price was not disclosed. Helms, a manufacturer of automobile and truck grilles, grill guards and other automotive accessories, will be operated as a wholly owned subsidiary of Penn-Ohio, Joseph B. Montgomery Jr., president of the parent company says. Helms has six plants in Grand Rapids.

—o—

Radisson Woodenware Co., Radisson, Wis.—copper lined boxes and other woodenware articles—will move its plant from Radisson to Fairchild where the company has three county-owned buildings under lease. G. O. Morris, manager of the company, says manufacturing operations will get under way as soon as possible.

—o—

National Steel Corp., Pittsburgh, appointed Columbus Steel Structures Co. as dealer in the Columbus, O., area. The Columbus firm's new offices and warehouse are nearing completion. It will handle Quonset-type all metal buildings for agricultural, industrial and commercial purposes and Stran steel framing, an exclusive product of Great Lakes Steel Corp., unit of National Steel.

—o—

Seven more men who will specialize in the sale of industrial controls, valves and Brown Instruments Division pyrometer supplies were named to the field staff of **Minneapolis-Honeywell Regulator Co.** The new appointees and the Honeywell branch office cities where each will make his headquarters are: Bruno Krause, Pittsburgh; R. A. Schwarz, Minneapolis and St. Paul; T. Sobottke, Hartford, Conn.; W. P. Ryan, East Orange, N. J.; D. Fritch, New York; C. Swanson, Detroit; and L. M. Crowe, Cleveland.

—o—

Guy B. Panero Engineers, New York, opened a new branch office in Washington that will offer a complete mechanical engineering service. Walter L. Rubel will be in charge of the office.

—o—

Marshall Richards Machine Co. Ltd. of Crook, Durham county, England, formed an American subsidiary to sell, engineer and service its products in the U. S. and Canada. The new company is Marshall Richards Machine Co. Inc., Trenton, N. J. It offers a complete line of equipment for drawing wire in all metals from as fine as .0004 in. to as coarse as 1 in. One of Richards' developments is the cold-cathode, grid-controlled, mercury-arc rectifier to produce with direct current motors a minimum speed for threading up and a complete range of needed variable speeds for drawing quality into the wire. Another development is the permanent-magnet spool drive. The simple torque-transmitting spooler provides constant spooling tension that can be adjusted from zero upwards.

—o—

Van Der Horst Corp. of America—chrome plating—is preparing to leave Olean, N. Y., for Salamanca, N. Y., where it will take over a city-owned plant.

—o—

Worthington Pump & Machinery Corp.'s Buffalo plant has an unbalanced production schedule because orders for heavy equipment are holding up well and orders for small equipment have fallen off sharply, says Works Manager Austin C. Ross. Worthington's main office is in Harrision, N. J.

—o—

A. E. Bausenbach Inc., Buffalo, a new company that developed a device in which jet engines are shipped, wound up its 1949 fiscal year with sales of $714,000 compared with $377,000 in 1948.

—o—

Walker Davis, representing **Lapham-Hickey Co.** Chicago, and **Blair Strip Steel Co.,** New Castle, Pa., opened new sales offices in Indianapolis. Lapham-Hickey handles a full line of warehouse steel products; Blair manufactures cold-rolled strip steel, spring steel and other products.

—o—

Mid-States Welder Mfg. Co., Chicago, opened its new general offices and factory, Dec. 16. The new building triples its facilities for manufacture of its line of "Metal Zipper" ac arc welders, "Missing Link" high frequency are stabilizers, 9000 arc torch welding accessories and its multipurpose saw gun.

—o—

Charles Dreifus Co., Philadelphia, moved to its temporary location in the Wallace & Warner Bldg., Bryn Mawr, Pa., pending completion of the Haverford Square building, Haverford, Pa., on or about Mar. 1, 1950, where permanent offices will be located.

—o—

D. V. Sawhill bought **Agaloy Tubing Co.,** Springfield, O., a firm employing 110 workers on specialized items (tubing for fishing rods, golf clubs). Mr. Sawhill is owner of Mercer Tube & Mfg. Co. and two other small Sharon, Pa., plants.

—o—

Weatherly Foundry & Mfg. Co., Weatherly, Pa., was named dealer for Allis-Chalmers Texrope drive equipment in Carbon, Lackawanna, Luzerne, Lycoming, Monroe, Northumberland, Schuylkill, Snyder and Tioga counties in Pennsylvania.

—o—

Carborundum Co., Niagara Falls, N. Y., started production of raw silicon carbide at its new $2 million plant at Vancouver, Wash. Material produced at Vancouver will be shipped to the company's eastern mills for processing into abrasives.

—o—

Machinists' Tools Inc. was incorporated in Buffalo, N. Y., with capital of $50,000. Incorporators are Regis O'Brien, J. Don Reep and John V. Cooke.

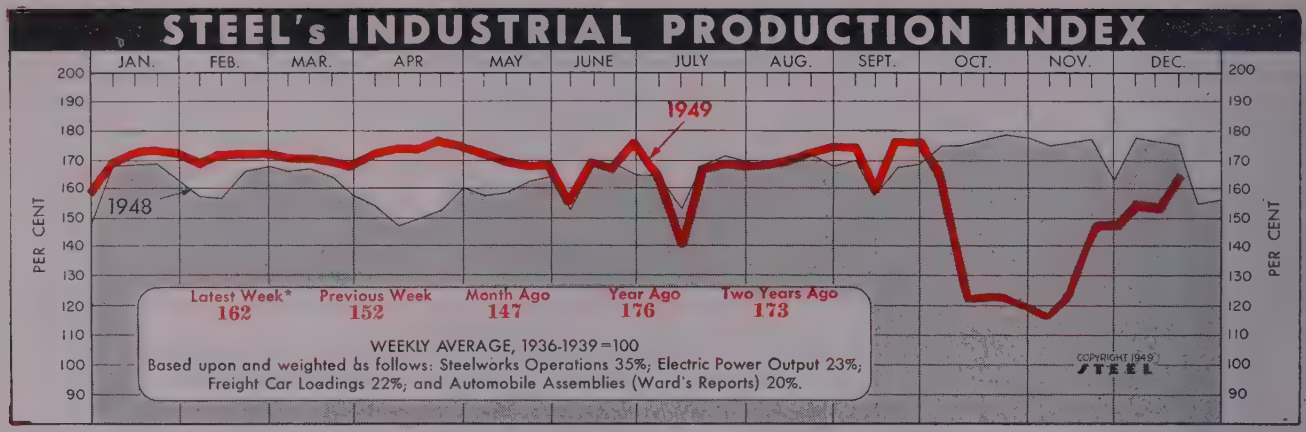
—o—

Sayre Tool Machine Co. Inc., taking over operations of Sayre Tool & Engineering Corp., Sayre, Pa., will begin operations in Elmira, N. Y., early next month. More than 100 persons will be employed.

—o—

Graver Water Conditioning Co., since its establishment as a separate division of Graver Tank & Mfg. Co. Inc., East Chicago, Ind., appointed three of the parent company's engineering representatives as its sales agents: J. R. Fortune & Son, Detroit; Stapp Engineering Co., Denver; and Process Equipment Co., Tulsa, Okla.

RADIATION DETECTOR: To measure radioactivity from a distance, this General Electric engineer uses a long probe radiation detector. It was developed by GE's General Engineering & Consulting Laboratory in Schenectady, N. Y. Engineer Charles Lemmond monitors a laboratory safe containing radioactive isotopes. NEA photo


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1949
1948
Latest Week* 162
Previous Week 152
Month Ago 147
Year Ago 176
Two Years Ago 173
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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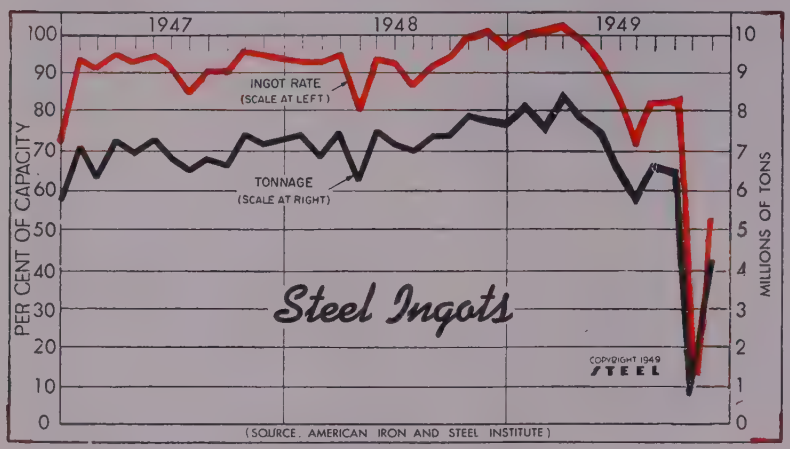
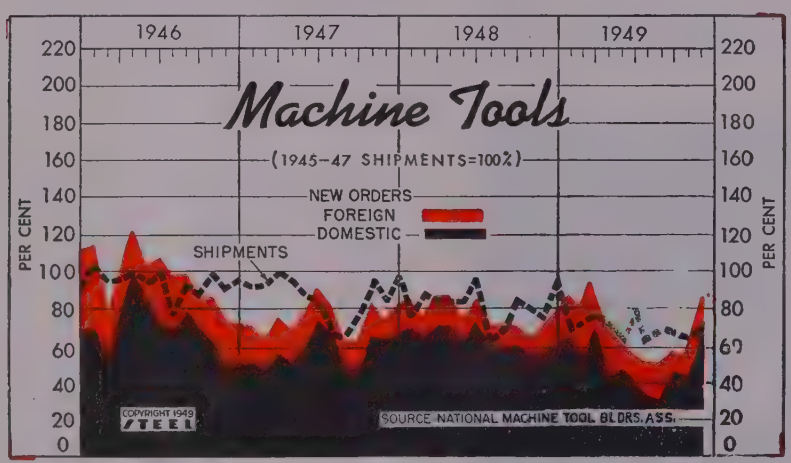
*Week ended Dec. 17 (preliminary).



Steel Ingots

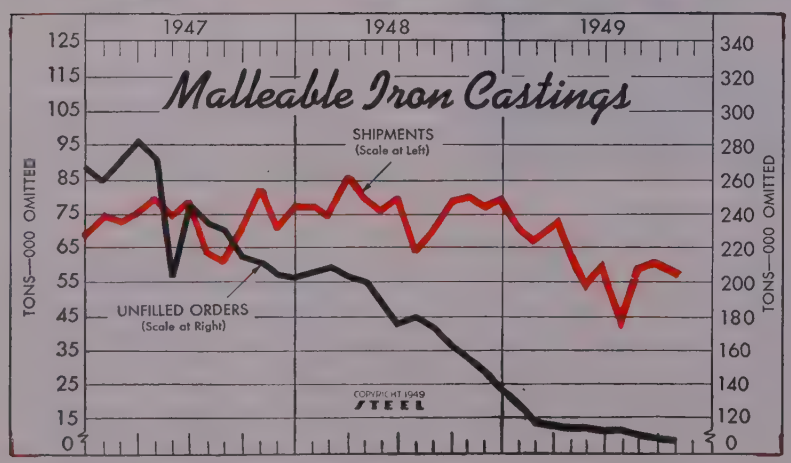
	Production (Net Tons—000)			Operating Rate (% of Capacity)		
	1949	1948	1947	1949	1948	1947
Jan.	8,183	7,473	7,213	100.2	93.6	93.2
Feb.	7,481	6,940	6,422	101.4	93.0	91.9
Mar.	8,388	7,608	7,307	102.7	95.3	94.4
Apr.	7,785	6,218	7,043	98.4	80.4	93.9
May	7,590	7,572	7,329	92.9	94.8	94.7
June	6,498	7,256	6,969	82.2	93.8	92.9
July	5,779	7,067	6,570	70.9	88.7	85.1
Aug.	6,715	7,438	6,982	82.2	93.1	90.2
Sept.	6,590	7,416	6,789	83.5	96.1	90.8
Oct.	926	7,987	7,560	11.3	100.0	97.7
Nov.	4,145	7,787	7,233	52.4	100.7	96.5
Dec.	....	7,771	7,366	....	97.5	95.4
Total	....	88,534	84,784	Ave. ...	94.0	93.0



Machine Tool Indexes

(1945-1947 Shipments = 100)

	Orders—Total		Orders—Domestic		Shipments	
	1949	1948	1949	1948	1949	1948
Jan.	87.0	83.1	65.1	69.1	68.8	75.3
Feb.	80.9	77.3	54.4	64.6	70.3	87.1
Mar.	93.5	86.3	71.2	70.2	75.8	83.6
Apr.	70.1	86.3	47.0	72.2	74.7	82.0
May	63.7	73.5	47.9	62.1	72.8	82.6
June	53.6	83.4	38.0	71.5	79.0	94.4
July	48.0	74.0	34.0	61.1	60.7	62.4
Aug.	51.5	73.7	32.7	60.9	67.3	69.8
Sept.	57.7	73.1	44.0	61.5	67.6	84.7
Oct.	56.8	67.4	43.1	53.4	62.3	80.4
Nov.	84.3	72.2	67.2	54.1	68.0	76.2
Dec.	...	76.7	...	60.5	...	96.9



Malleable Iron Castings

(Net tons in thousands)

	Shipments		Unfilled Orders*	
	1949	1948	1949	1948
Jan.	71.9	77.7	126	206
Feb.	66.7	75.2	118	209
Mar.	72.1	86.8	102	203
Apr.	61.3	80.6	95	200
May	54.6	76.1	79	192
June	59.6	81.7	70	179
July	44.4	64.9	71	180
Aug.	58.1	73.3	61	177
Sept.	60.5	77.8	58	164
Oct.	57.2	81.8	54	158
Nov.	...	77.2	...	146
Dec.	...	79.9	...	137
Total ...	...	933.1	...	...

* Castings for sale.

The Business Trend

ANOTHER big rise in STEEL's industrial production index was recorded in the week ended Dec. 17 as the index climbed 10 points from the level of the preceding week to a preliminary 162 per cent of the 1936—1939 average. The latest mark is 1 point higher than the index for the last week before the steel strike.

AUTOMOBILES—An increase of more than 24,000 assemblies by the automotive industry supplied the power for the index's upward climb. The total for the week ended Dec. 17 was 86,624 passenger cars and trucks compared with 52,514 in the preceding week. Production will continue to improve as the automakers pick up speed on 1950 model assemblies. Despite production interferences the fourth quarter will net close to 1,196,000 cars and trucks for the Big Three of the industry. Only the second and third quarters of this year have better postwar output totals. Independent producers, however, have not fared as well. Their last quarter total will plunge to about 200,000 units, the lowest total for any quarter since late 1946.

STEEL—Output of steel for ingots and castings moved up to 94.5 per cent of capacity in the week ended Dec. 17 from 93 per cent in the preceding week. This figure equals production during the last week in May. Steelmaking is expected to continue to show strength in the immediate future with a decline expected in the week between the holidays.

POWER—For the second consecutive week a new all-time weekly record for electric output was set. In the week ended Dec. 17 the light and power industry produced 5,996,606,000 kwh to top the 5,881,360,000 kwh generated in the preceding week. The week-old mark in turn was 71 million kwh higher than the former record set in the last week of January, 1949.

TRUCKLOADINGS—Volume of freight transported by motor carriers in October decreased 1.6 per cent below September but increased 4.4 per cent over October, 1948. American Trucking Associations Inc. totals show carriers transported 3,380,224 tons in October, compared with 3,433,536 tons in September and 3,238,794 tons in October, 1948. Carriers of iron and steel hauled about 3 per cent of the total tonnage. Their traffic volume decreased 48.6 per cent below a month earlier and 41.2 per cent below the like month a year ago.

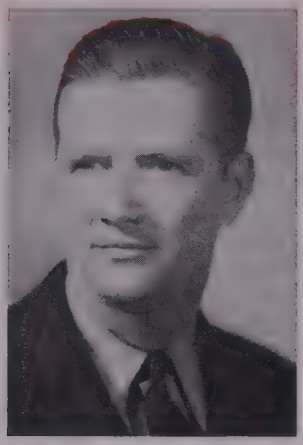
COAL—With mines operating on a three-day workweek output of bituminous coal in the week ended Dec. 10 dipped 50,000 tons from the total for the preceding week to 9.2 million tons. A few small mine operators have reached an agreement with the United Mine Workers but the bulk of the mines are still without a contract and, therefore, on the abbreviated work-week.

CONSTRUCTION — Civil engineering construction awards fell far below the preceding week's awards to $119,434,000 in the week ended Dec. 15. In the preceding week awards totaled $302,115,000, the highest weekly total for the year and second best postwar.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	94.5	93.0	56.0	99.5
	Electric Power Distributed (million kilowatt hours)	5,997	5,881	5,644	5,790
	Bituminous Coal Production (daily av.—1000 tons)	1,533	1,542	1,183	2,041
	Petroleum Production (daily av.—1000 bbl)	4,900‡	4,979	5,211	5,750
	Construction Volume (ENR—Unit $1,000,000)	$119.4	$302.1	$217.8	$146.2
	Automobile and Truck Output (Ward's—number units)	86,624	52,514	115,152	123,315
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons. ‡Preliminary.				
TRADE	Freight Car Loadings (Unit—1000 cars)	645†	669	759	755
	Business Failures (Dun & Bradstreet, number)	195†	191	183	96
	Money in Circulation (in millions of dollars)‡	$27,701	$27,699	$27,397	$28,369
	Department Store Sales (changes from like wk. a yr. ago)‡	—4%	—8%	—8%	—1%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$13,908	$13,902	$12,928	$14,858
	Federal Gross Debt (billions)	$256.9	$256.9	$256.9	$252.2
	Bond Volume, NYSE (millions)	$25.0	$20.7	$20.6	$17.8
	Stocks Sales, NYSE (thousands of shares)	10,822	8,781	7,420	5,479
	Loans and Investments (billions)†	$66.9	$66.8	$66.7	$62.6
	United States Gov't. Obligations Held (millions)†	$37,153	$37,248	$37,042	$33,179
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	152.52	152.52	152.52	151.86
	STEEL's Nonferrous Metal Composite‡	161.8	162.4	169.3	232.6
	All Commodities†	151.1	151.0	151.4	162.6
	Metals and Metal Products†	168.7	168.9	169.4	173.6
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

Men of Industry



E. W. HARWELL

E. W. Harwell has been elected president of **Hamilton Steel Co.,** Cleveland, effective Jan. 1, to succeed **Harry K. Hamilton,** who will retire Dec. 31 as president and a director of the company. **Jackson D. Allen Jr.** has been appointed general sales manager, and **N. E. Willkomm,** assistant general sales manager. The stock interest of the Hamilton family has been retired and Hamilton Steel is now a wholly-owned subsidiary of Fort Duquesne Steel Co., Pittsburgh. Mr. Harwell joined Hamilton Steel a year ago as vice president and general manager after a long association with Jones & Laughlin Steel Corp. Mr. Hamilton, prior to founding Hamilton Steel Corp. in 1931, was manager of Edgar T. Ward's Sons Co. warehouse at Cleveland.

—o—

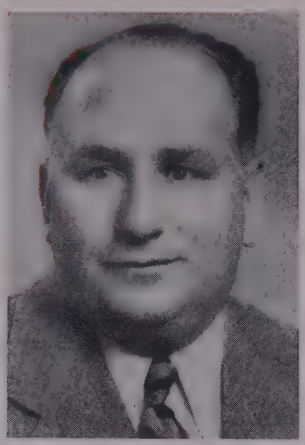
American Gas Furnace Co., Elizabeth, N. J., announces election of **P. C. Osterman** as president and treasurer, and **A. W. Machlet** as chairman of the board. Mr. Osterman has been associated with the company for more than 45 years.

—o—

Phil L. Fett, general purchasing agent, **Doehler-Jarvis Corp.,** New York, has retired due to ill health. **Robert A. Bower,** who has been serving as assistant general purchasing agent, will assume responsibility for the details of the purchasing department of the corporation, and **F. J. Koegler,** executive vice president, will act as director of purchases.

—o—

Walt Scott has been appointed manager of the order service department of **Cleveland Chain & Mfg. Co.,** Cleveland.



GEORGE W. WALTON

George W. Walton, long associated with the oil field equipment business, has been elected executive vice president and member of the board of directors of **International Derrick & Equipment Co.,** Dallas, subsidiary of Dresser Industries Inc. He joined Ideco in 1944 and has been vice president in charge of its machinery and export sales division.

—o—

Vanadium-Alloys Steel Co. announces appointment of **Charles W. Wiegel** as general manager and **Robert E. Shoup** as general superintendent of its Colonial Steel Division, Monaca, Pa.

—o—

Leo A. Kraemer, former superintendent, By-Product Coke Division, Pittsburgh Steel Co., has been named operations engineer for the engineering and construction division of **Koppers Co. Inc.,** Pittsburgh. As operations engineer, Mr. Kraemer will work under the direction of the division general manager in contacting coke plant managers to consult with and advise them on coke plant operating problems. He left Koppers in 1933 to take the post of assistant coke plant superintendent at the Steubenville plant of Wheeling Steel Corp. From 1941 until he returned to Koppers in 1949 he was with Pittsburgh Steel Co.

—o—

Janette Mfg. Co., Chicago, builder of gear-motors and rotary converters, announces appointment of **W. H. SaLee** as general sales manager. Mr. SaLee will take over this position effective Jan. 1, succeeding **Harvey Klunder,** resigned. **Ogden J. Maag** will continue as assistant sales manager, and **Frank C. Hartmann,** who recently joined the company, will assist Mr. Maag.

G. G. BEARD

G. G. Beard has been elected executive vice president of **United Engineering & Foundry Co.,** Pittsburgh. He began service with United as an engineer in 1927. He was elected a vice president in 1943 and became a director of the company in 1944. Mr. Beard is also president of Lobdell United Co. of Wilmington, Del., and of Stedman's Foundry & Machine Works Inc., Aurora, Ind., both subsidiaries of United Engineering & Foundry Co.

—o—

Anthony M. Ryerson has been appointed assistant general manager of sales for **Inland Steel Co.,** Chicago, succeeding **Neele E. Stearns,** elected executive vice president, Inland Steel Products Co., Milwaukee, an Inland subsidiary. Mr. Ryerson has been associated with Inland Steel since 1939. In January, 1949, he became assistant to the manager of sheet and strip division, and in April was elected to the company's board of directors.

—o—

Rolock Inc., Fairfield, Conn., fabricator of heat and corrosion alloys, announces appointment of **Elmer A. Terwell** as its sales engineer in the Chicago territory. He has had wide experience in the high alloy field with Driver-Harris Co., Salkover Metal Processing Co., and has served as secretary-treasurer of the Chicago chapter of American Society for Metals. His headquarters will be in Chicago.

—o—

G. R. Brophy, research metallurgist, will head the New England technical section of **International Nickel Co. Inc.'s** development & research division, Hartford, Conn., on Jan. 1. He

FASTER

than the "FASTEST THING IN FASTENINGS"

SPEED NUTS* in continuous strips

Now, assembly costs can be lower and savings higher than ever before. By producing flat-type SPEED NUTS in continuous strip form—Tandem SPEED NUTS—Tinnerman helps solve the critical problem of what to do about production costs.

No longer is the motion of selecting and picking up individual fasteners wasted. The SPEED NUT on the end of the strip is at the tip of the screwdriver at all times—so much easier to handle than an individual nut.

When tightened, a partial shear between each SPEED NUT permits the operator to break the strip away quickly, easily and cleanly—ready to move to the next location. Another saving—there's no loss from SPEED NUTS dropped or the floor.

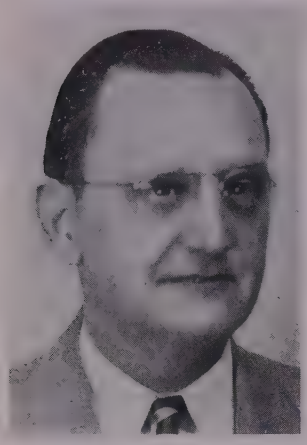
Ask your nearby Tinnerman representative—he's listed in major city phone directories—or write us for full details on this newest Tinnerman money-saver. TINNERMAN PRODUCTS, INC., 2040 Fulton Road, Cleveland 13, Ohio. In Canada: Dominion Fasteners Ltd., Hamilton.

It's so easy to locate and to hold Tandem SPEED NUTS while tightening.
Snap! The strip breaks off—and is ready for the next bolt.
TINNERMAN
Speed Nuts
*Trade Mark Reg. U. S. Pat. Off.
FASTEST THING IN FASTENINGS

joined the corporation in 1936 in the research laboratory at Bayonne, N. J., as research metallurgist, and later was placed in charge of the laboratory's steel section.

—o—

C. J. Garrigan has been appointed manager of **S. P. Kinney Engineers Inc.,** Carnegie, Pa. He became associated with the company in 1947 as sales engineer and became manager of sales in 1948. Before joining S. P. Kinney Engineers, he was district sales representative for Clinton Machine Tool Co. and Turchan Follower Machine Co.



C. J. GARRIGAN

—o—

William N. Hoelzel has been appointed assistant manager of railroad sales, **Gary Screw & Bolt Division,** Pittsburgh Screw & Bolt Corp., at Chicago. Mr. Hoelzel has been connected with the company since 1928 in a sales capacity.

—o—

Simonds Abrasive Co., grinding wheel and abrasive manufacturer, Philadelphia, announces appointment of **John H. Kishman** as district manager for Ohio, with the exception of Toledo, and for western Pennsylvania, centering in Cleveland and Pittsburgh. Mr. Kishman has been sales representative for the company in southern Ohio for many years, with headquarters in Dayton.

—o—

New officers of the **Electric Industrial Truck Association,** Philadelphia, are: **M. W. Heinritz,** Gould Storage Battery Corp., president; **W. A. Meddick,** Elwell Parker Electric Co., vice president; and **W. Van C. Brandt,** managing director of EITA, was re-elected secretary-treasurer. Mr. Heinritz succeeds **F. J. Shepard Jr.,** Lewis-Shepard Products Inc., as president of the association.

—o—

Albert I. Edwards has been named basic industries machinery specialist for **Allis-Chalmers Mfg. Co.'s** mid-Atlantic region, and **William D. Busch,** former crusher sales application engineer in the company's basic industries machinery department, has been appointed to the Youngstown district office as a sales representative. **Henry H. Stark,** former application engineer, grain and chemical milling machinery section, was assigned to the southwest region, with headquarters in Oklahoma City, Okla.

—o—

Robert B. Colgate has been elected a director of **American Car & Foundry Co.,** New York. He formerly was vice president of research and development and a member of the executive committee of Colgate-Palmolive-Peet Co.

—o—

Paul J. Carlisle will retire Jan. 1 from **E. I. du Pont de Nemours & Co. Inc.,** Wilmington, Del., after a career of more than three decades in the chemical industry. For the last four years he has been manager of field research for DuPont's electrochemicals department.

—o—

International Business Machines Corp., New York, announces appointment of **Dr. Cuthbert C. Hurd** as director of its applied science department.

—o—

J. H. Berryman has been appointed assistant to the manager, technical sales division, **Air Reduction Sales Co.,** New York. He will assist **Scott D. Baumer,** manager, technical sales division, and will be responsible for technical promotion and sales of equipment for the recently introduced Aircomatic welding process. Mr. Berryman joined Air Reduction in 1946, and served in the technical sales division as machine welding specialist and assistant metallurgical engineer until his recent promotion.

—o—

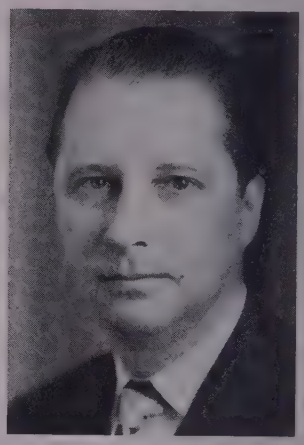
Kenneth H. Jacobs, research engineer in the applied mechanics department of **Armour Research Foundation,** Illinois Institute of Technology, has been named supervisor of that department's propulsion section. He has been associated with the foundation as an engineer since 1946.

—o—

Dr. Zay Jeffries, vice president of **General Electric Co.,** in charge of the chemical department, Pittsfield, Mass., will retire from the company Dec. 31. He has been a member of General Electric's four-man committee which administers the Nucleonics Project, consisting of all work on atomic energy being conducted by the company for the government. During the war he was vice chairman of the War Metallurgy Committee and chairman of two of its subcommittees.

—o—

Bernard J. Oos has been appointed advertising manager, **Liquid Carbonic Corp.,** Chicago. He has been assistant advertising manager for the last two years. Before joining Liquid Mr. Oos was with Hotpoint Inc., Chicago, in the sales promotion department.



BERNARD J. OOS

—o—

Douglas G. Eaton has been appointed manager of the Cleveland branch office of **Reed-Prentice Corp.,** Worcester, Mass., manufacturer of plastic injection molding machines, die casting machines and machine tools. He has had many years of experience in the injection molding field.

—o—

Joseph P. Coonahan, affiliated with **Midvale Co.,** Nicetown, Philadelphia, has retired after more than 40 years' association. He is succeeded as purchasing agent by **Joseph Flynn,** appointed manager of stores and purchases.

—o—

J. K. Beeson, executive vice president, Pittsburgh Steel Co., Pittsburgh, has been elected president of the **Pittsburgh Gage & Supply Co.,** Pittsburgh. He will succeed **Sherman C. Parker,** elected chairman of the board. Mr. Beeson will leave Pittsburgh Steel Co. in April to assume his new duties.

—o—

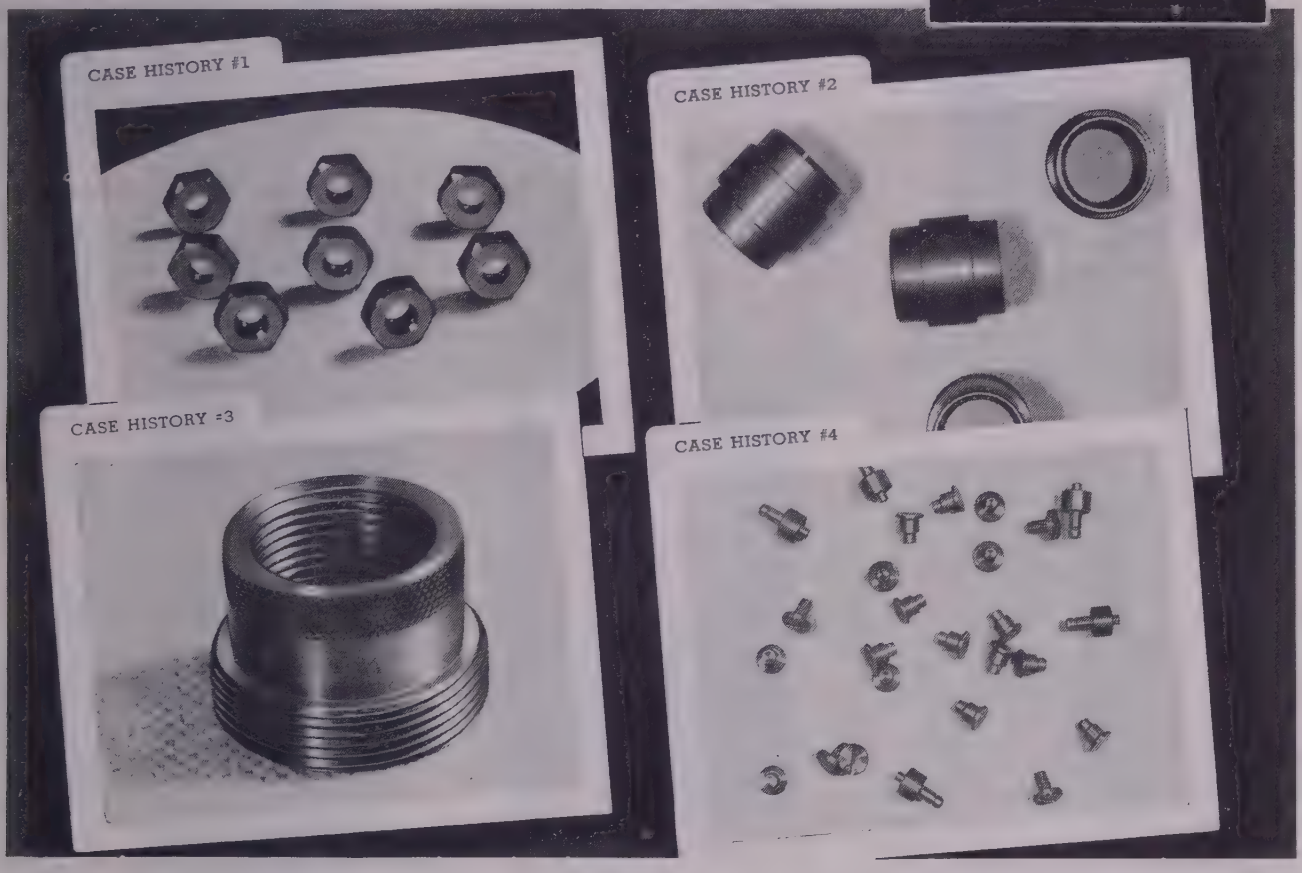
C. E. Jefferson of Montreal, Canada, has been elected vice president of traffic of the **Canadian Pacific Railway,** succeeding **G. Allan MacNamara,** who held the post two years and who was elected president of **Minneapolis, St. Paul & Sault Ste.**

Four typical machine shops report

"LONGER TOOL LIFE"
"BETTER FINISH"
"FASTER OPERATION"
} *WITH NEW*

J&L *FREE-CUTTING* "E"* *STEEL*

J&L STEEL



Four typical examples, taken from 100 case histories, show superior machinability of J&L "E" Steel.

For 4 years before "E" Steel was publicly announced, this new, free-cutting bessemer screw stock was tried by independent machine shops throughout the metal-working industry.

More than 6,100 tons were tested in over 100 applications!

Here are quotations from 4 typical case histories:

CASE HISTORY 1# ". . . new steel machines very well . . . finish excellent . . . tool life increased . . . 5 to 10% better production."

CASE HISTORY #2 ". . . tool life increased 100% at normal speeds . . . better finish . . . shop people liked it."

CASE HISTORY #3 ". . . tool life increased two to four times . . . we were able to tap 1" full internal pipe thread, almost impossible on regular material."

CASE HISTORY #4 ". . . tool life increased up to 200% . . . uniformity of finish remained constant . . . considerably increased speeds without sacrifice to finish."

You too can get greater economies in your machining operations with new J&L free-cutting "E" Steel. "E" Steel is available in three grades: E-15, E-23 and E-33, each within the composition limits of the standard bessemer screw steels and with similar tensile properties. All standard sizes and shapes are available. For further information write for your copy of our new booklet: "J&L 'E' Steel."

Jones & Laughlin Steel Corporation
404 Jones & Laughlin Building
Pittsburgh 19, Penna.

Please send me a copy of "J&L 'E' Steel."

Name _____

Company _____

Address _____

JONES & LAUGHLIN STEEL CORPORATION

* "E" STEEL IS QUALITY-CONTROLLED FROM OUR OWN MINES THROUGH THE FINISHED PRODUCT

Marie Railroad, the change effective Jan. 1.

—o—

Russell S. Colley has been named

RUSSELL S. COLLEY

manager of the sales of Rivnuts and Rivnut tools employed in their application by **B. F. Goodrich Co.,** Akron. The Rivnut, developed by the company, is a blind rivet which can be used either as a rivet or a nut plate. Becoming a sales engineer in 1938, Mr. Colley has handled Rivnuts, De-Icers and self-sealing fuel cells for airplanes on which he also holds a number of patents.

—o—

Dr. Charles A. Thomas, executive vice president, Monsanto Chemical Co., St. Louis, and one of the key figures in the atomic energy development, has been elected chairman of the board of directors of the **American Chemical Society,** New York. Dr. Thomas, who was president of the society in 1948, will take office Jan. 1 succeeding **Prof. Roger Adams,** University of Illinois.

—o—

Stuart M. Phelps, Senior Fellow, Mellon Institute, and director of research and tests, American Refractories Institute, has been chosen as recipient of the **1950 Albert Victor Bleininger Award,** highest honor conferred in this country for distinguished achievement in the field of ceramics. The award will be presented March 10 at a dinner in Pittsburgh given in his honor by the American Ceramic Society Inc.

—o—

Morton Downey has been elected a director of **General Aniline & Film Corp.,** New York. He is executive vice president of Carbagel Inc., chemical concern, and for several years has been associated with the operations of the Chicago Merchandise Mart as well as other enterprises of Joseph P. Kennedy, formerly U. S. Ambassador to Great Britain.

—o—

Percy H. Waller has been appointed manager, railway division, **Manganese Steel Forge Co.,** Philadelphia. He will have headquarters in Chicago. Mr. Waller was formerly associated with Pullman Co., where he served over a period of 37 years, more recently as assistant chief engineer and assistant to the chief maintenance officer.

—o—

Clarence S. Simpson has been promoted to traffic manager of **E. I. du Pont de Nemours & Co. Inc.,** Wilmington, Del., effective Jan. 1. He will succeed **Harvey S. Farrow,** who will be ending 43 years of employment with the company. Mr. Farrow has been traffic manager for 19 years.

—o—

Alvin A. Borgading, industrial purchasing executive, and former vice

ALVIN A. BORGADING

president in charge of purchases for American Car & Foundry Co., New York, has organized his own New York firm of manufacturers' representatives, the **Alborg Supply & Equipment Co.** The new concern will specialize in purchasing services in the railroad, oil and marine construction fields. Mr. Borgading will serve as president, with offices at 50 Church St., New York. He was associated with American Car & Foundry Co. for 42 years, and had been vice president since 1943.

—o—

DeBardeleben Coal Corp., Birmingham, announces election of **Henry F. DeBardeleben** as chairman of the board and **Newton H. DeBardeleben** as president.

—o—

Albert Draunlich, assistant to the works manager, **Buflovak Equipment Division,** Blaw Knox Co., at Buffalo, has been appointed general superintendent of the division, succeeding **Fred. K. Hohlstein,** retired.

—o—

Ross Wilkins, assistant vice president and assistant general manager of sales since 1946, has been appointed general manager of sales for **Great Lakes Steel Corp.,** Ecorse, Mich. **Earl DuBois,** manager of sheet sales, succeeds Mr. Wilkins.

—o—

John P. Roche, vice president of Heppenstall Co., Pittsburgh, is the new president of the **Machine Knife Association,** composed of manufacturers of metal and wood cutting knives.

—o—

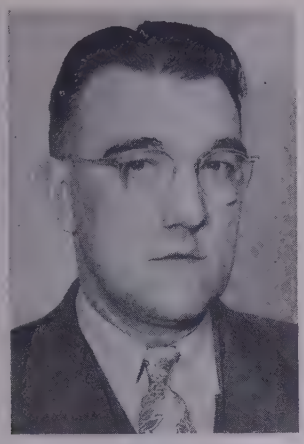
O. W. Young, who joined **Buick Motor Division,** General Motors Corp., at Flint, Mich., 42 years ago as a lathe hand and rose to the company's highest manufacturing post, has announced his retirement from active duty to become a Buick dealer at Tucson, Ariz. Since early this year he has served as executive assistant to the general manager. For the previous 12 years he had been general manufacturing manager. **Floyd N. Gardner** has been named director of inspection for the Buick division at Flint, succeeding **Charles N. Ofield,** retired after nearly 42 years' service with Buick. Mr. Gardner, with Buick since 1927, has been assistant general inspector in charge of manufactured parts. **Donald Taylor** was named assistant general inspector to succeed Mr. Gardner. **A. R. Bender** continues as assistant general inspector in charge of purchased parts.

—o—

Ivor D. Sims has been appointed purchasing agent of **Bethlehem Steel Co.,** Bethlehem, Pa. He joined the

IVOR D. SIMS

company in 1933 as junior buyer and was advanced to buyer in 1939 and, in 1944, was appointed assistant purchasing agent.



WILLIAM WALK

William Walk has been appointed division superintendent, heat treating and forge division, at Homestead Works of **Carnegie-Illinois Steel Corp.,** subsidiary of U. S. Steel Corp., Pittsburgh. Mr. Walk began with U. S. Steel as a metallurgist at Clairton, Pa., Steel Works of the subsidiary company in 1930, and has been assistant to the general superintendent at the Homestead Works since 1946. He succeeds the late **Albert B. Steigerwait.**

—o—

Robert C. Norton has been elected chairman of the board of **Oglebay Norton & Co.,** Cleveland. He succeeds the late **Crispin Oglebay. Alfred M. Rankin** has been elected a director of the company. Mr. Norton, for many years vice president and treasurer, was elected vice chairman in July of this year.

GEORGE H. SCOTT

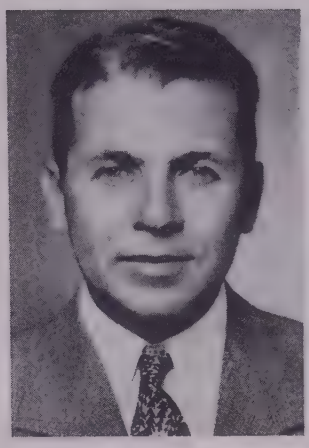
George H. Scott has been elected president of the **Vacuum Cleaner Manufacturers' Association.** He is head of Scott & Fetzer Co., Cleveland.

—o—

Don H. Smith has been appointed assistant sales promotion manager, and **George H. Gruenwald** as assistant advertising manager, Willys-Overland Motors Inc., Toledo, O.

—o—

Steel Sales Corp., Chicago, announces appointment of **L. J. Buckley** as manager of the newly formed accessories department. This department will make available, from one source, fastenings, pipe fittings, utensils, wire rope, safety tools, screens, etc., in all commercial metals, except plain steel. Certain special alloys and precision castings and forgings will also be available.



RALPH HANES

Ralph Hanes has been appointed director of advertising and sales promotion of **Dodge Mfg. Corp.,** Mishawaka, Ind., manufacturer of power transmission machinery. Since 1942 Mr. Hanes has been promotion manager of the mechanical goods division, United States Rubber Co., New York, where he was responsible for advertising and sales promotion program of 11 sales departments and three sales subsidiaries. At the Dodge Mfg. Co. Mr. Hanes succeeds to the position which had been held for more than 20 years by the late **W. W. French.**

—o—

Helwig Co., Milwaukee, announces appointment of **R. W. Fletcher** as its San Francisco representative. For the last several years he has been associated with his father, **F. S. Fletcher,** Helwig's Los Angeles distributor.

OBITUARIES...

Walter A. Janssen, who retired in July from the **Department of Commerce,** Washington, where in recent years he was consultant on iron and steel, nonferrous metals and minerals, and nonmetallic minerals, died Dec. 18. He also worked closely with the War Production Board, Office of International Trade, and other government units. Mr. Janssen joined the department in 1938 when he became chief, Metals & Minerals Division, Bureau of Foreign & Domestic Commerce. Since retirement he has been an industrial consultant, with headquarters in Washington. With 16 years in the steel casting business, he had association with Bettendorf Co., Davenport, Iowa, Canadian Steel Foundries Ltd., Montreal, and American Steel Foundries, Chicago. From 1923 to 1938, except for a short period with National Recovery Administration, Mr. Janssen conducted a business as industrial consultant with offices in Chicago and Pittsburgh.

—o—

Maryan G. Maday, 65, founder and owner of **Maday Body & Equipment Corp.,** Buffalo, died of a heart attack Dec. 15. He founded the Maday Body Works in 1908. The company manufactured truck and bus bodies until 1939, when it moved to a new location and was incorporated.

—o—

Frank N. Phillips, 75, president, **Washburn Wire Co.,** East Providence, R. I., and New York, died Dec. 9 at Providence. He was a director of several industrial and banking companies, including Associated Springs Corp., Bristol, Conn.

—o—

Katherine Gordon, 74, sales representative in the Providence, R. I., area for **New York & New Jersey Lubricant Co.,** died Nov. 30. She joined the firm in 1936, taking over the duties of her late husband, S. S. Gordon.

—o—

William F. Ward, 65, former superintendent of **Kennedy Valve Mfg. Co.** plant in Elmira, N. Y., died Dec. 14. He had been associated with the firm for more than half a century, holding several executive posts.

—o—

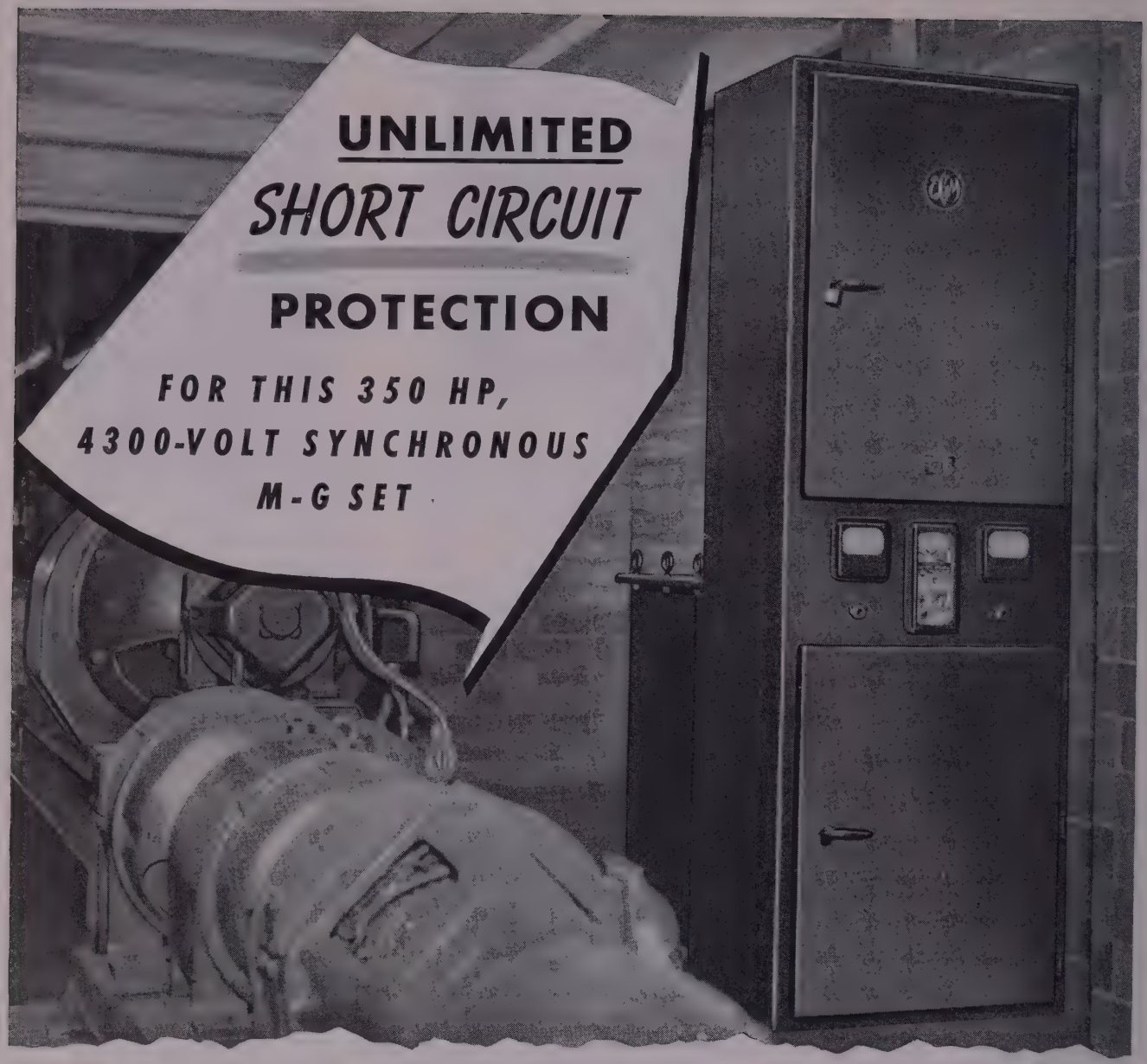
R. C. McDonald, secretary-treasurer, **Dominion Steel & Coal Corp.,** died in Montreal Dec. 13. At one time he was secretary-treasurer of Nova Scotia Steel & Coal Co.

—o—

E. E. Barney, 83, retired supervisor of all **Remington Rand Inc.** plants, died Dec. 13 at his home in Ilion, N. Y.

—o—

Philip Kaiser, 62, export department, **New York & New Jersey Lubricant Co.,** New York, died Dec. 5 at his home in Freeport, N. Y. He joined the firm in 1906.



with E C & M VALIMITOR (Volt-Ampere-Limitor) STARTER

There's no ceiling on VALIMITOR protection because fault currents are limited to a maximum of 25,000 KVA (steady state current) and the well-known Type ZHS Contactor used in these starters clears such faults quickly.

Because protection is unlimited—there's no need for calculating existing short circuit capability—no need to fear that these starters will be out-moded by future growth in KVA.

Also there are no fuses to replace after a fault. Protection is permanent, today and forever.

Write for **COMPLETE FACTS - ASK FOR No. 23 ACCELERATOR BULLETIN**

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET ★ CLEVELAND 4, OHIO

Production and Engineering NEWS AT A GLANCE

CUTS REJECTS BY 75 PER CENT—New basis for purchasing steel which may eliminate as much as 75 per cent of rejections due to off heats was revealed by Ralph Richardson, manager, technical data section, Research Laboratories, General Motors Corp., Detroit. Developed through 12 years of research, the procedure is based upon specifying steel requirements according to standards of hardenability instead of according to results of chemical analysis. Originally developed by W. E. Jominy, the method is expected to pass on huge savings to steel mills, warehouses and fabricators.

VAPOR DEPOSITION—Most generally useful method revealed to date for forming refractory coatings pertinent to gas turbines involves the vapor-deposition processes in which the coating is formed by chemical reaction at the heated surface of the base material, according to Battelle Memorial Institute, Columbus, O. It is pointed out that perhaps the most outstanding development on vapor-deposition processes is the development of protective coatings for molybdenum that have permitted its use in air for over 5000 hours at 1800° F, and as long as 200 hours at 3100° F.

INSPECTION PLUS—Making a television set is an intricate job. It requires some 1450 separate operations and able support of thoroughly trained inspectors. At the Sunbury, Pa. plant of Westinghouse, the latter are spaced at close intervals along hairpin-shaped production lines to keep a careful check on quality and workmanship. Even before the picture tube is added, the chassis with its complicated wiring is inspected and tested 19 times. Of the 6½ hours it takes to complete a set, more than 1½ hours are devoted to inspections.

SLASHES DOCK HANDLING COSTS—Handling costs in receiving are now $15.60 less at the plant of Johnson Steel & Wire Co., Akron, O. Cost of unloading boxcars was reduced from $17 to $1.40 by the use of a Baker-built truck that unloads and stores coils of incoming wire in 45 minutes to an hour. The truck, with its forks brought together to form a ram, picks up 300-pound coils of wire six at one time —stacking them 2 and 3-high. The job formerly required the services of four men working 4 to 5 hours.

ROLLER FINISHING—Roller coating method that handles either flat sheet or coil in widths up to 48 inches at rates up to 50 feet per minute is used to apply the primer coat on aluminum clapboard siding produced by Permanente Metals Co. The West Coast company's technique is a continuous process in which degreased sheets pass between leveling rolls, then through the roll coater consisting of a series of adjustable rubber rolls. Uniform thickness of the primer film on the metal is obtained by adjusting the setting of the several rolls. The primer coat is dried in less than a minute by passing the sheets under a 54-foot bank of 100-watt infrared lamps.

STAINLESS BELTS FOR COAL—Initial tests of a stainless steel conveyor belt for carrying coal proved successful, it was revealed by Bituminous Coal Research Inc., Pittsburgh. Although the tests conducted at Johnstown Coal & Coke Co.'s Crichton mine in Nicholas County, W. Va., did not prove that stainless belts are developed to the point of commercial utilization for this purpose, they did show that basic fundamentals of such use are sound. It is felt further development to make possible limited commercial use of these type belts for coal will require another 6 months.

ALWAYS SAMPLE—First rule of good aluminum welding practice in all cases is to see that a sample weld is produced. Initial machine adjustments by the operator, it is pointed out, should be made from standard tables that indicate proper settings and electrode sizes and shapes for specific gages and types of alloys. Quality of the trial welds is found by driving a chisel between the sheets near the welds or by a "peel" test. Each spot weld should pull a button with a diameter equal to twice the thickness of the material plus 1/16-inch. (p.46)

RAPID MOLDING—The six casting machines employed in precision casting operations at Michigan Steel Casting Co., Detroit, essentially are small steel-encased crucibles. These are mounted on trunnions to permit them to be inverted quickly when the inverted mold is positioned over the pouring hole. The charge in each is calculated carefully so that at the moment of pouring there is just enough metal to fill the mold. Rapid operating cycle of each machine enables some 75 molds to be cast in a 24-hour day. (p.50)

FAST HEATING—Normalizing procedure used by Taylor-Wharton Iron & Steel Co., in processing truck type, high-pressure gas cylinders, heats the work so rapidly that practically no scale is formed on the surfaces of the steel. The cylinders leave the furnace at a temperature of 1450° F which is only 40° above the critical point instead of the 290° differential which existed when employing a previous method of treatment. (p.53)

TELEGRAPHIC ECHO—History of the wire industry is "bearded" and chuck-full of events. It passed its second revolution about 100 years ago. The first, the application to wire drawing of external power, was about 1360. The second is harder to date, but the years between 1845 to 1870 cover it, with the "hot" decade from 1855 to 1865. It was sparked by the electric telegraph, which brought the first insistent demand with tonnage implications for long, smooth, flawless pieces of coarse wire. From then on, like chain reaction, a number of latent ideas blossomed into practice. (p.58)

How to Take

Recent developments in resistance welding have solved many problems some technicians may still believe are incident to welding nonferrous metals. These up-to-the-minute recommendations for more effective shop practice were prepared by the Resistance Welding Institute in the interest of clearing up difficulties that may be encountered in welding aluminum surfaces

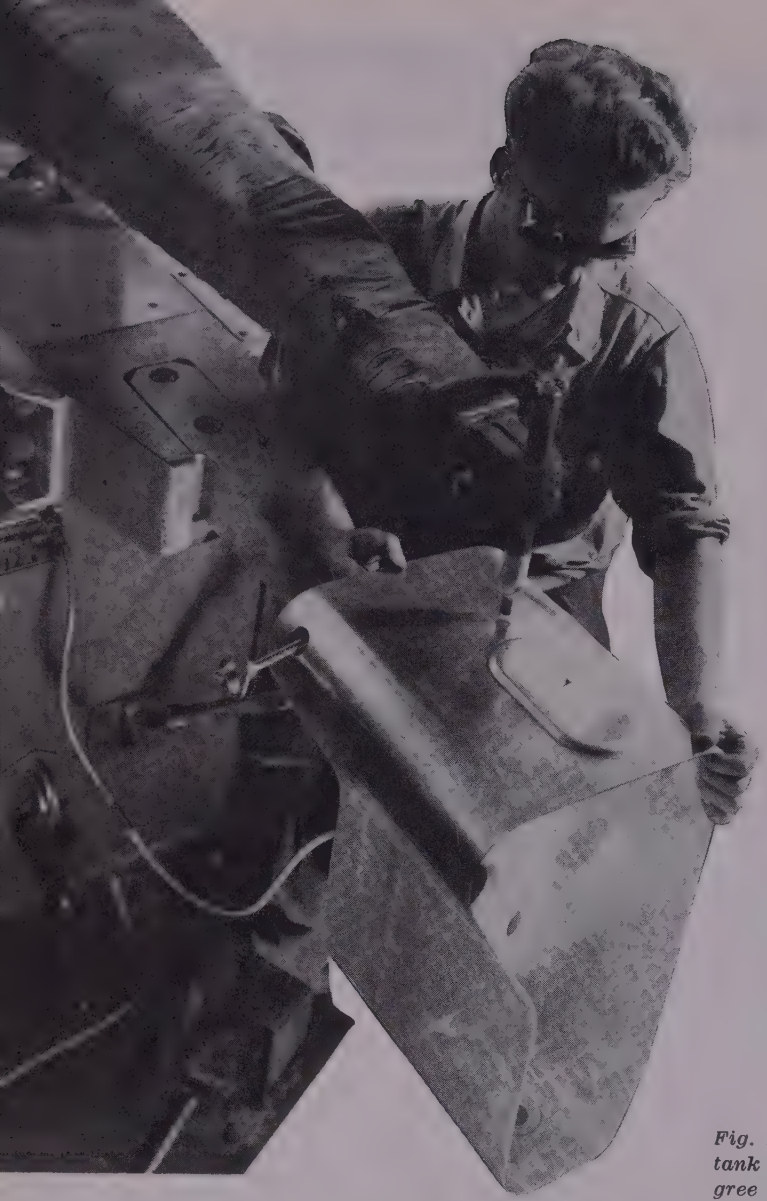


Fig. 1—Joining baffle plate to sidewall of gasoline tank by spot welding. Flat upper electrode, 11-degree conical lower electrode. Gage 0.081-inch, grade 3S½H sheet. Tank capacity 19 gallons

MOST commercial aluminum alloys, in sheet form or extrusions, may be spot welded successfully provided thicknesses involved are not too great and proper skill and preparation are brought to the work.

Nature of aluminum and aluminum alloys is such that they have a high conductivity to heat and electric current and so require higher values of welding current and shorter welding times for the production of optimum spot welds.

Process control factors, then, are much more critical in the case of these alloys than for mild steel. A correspondingly narrower range of permissible settings, therefore, is required for each gage. Also, the effect of surface conditions on satisfactory aluminum welds is extremely important.

With these basic considerations in mind, it is apparent that equipment used for welding steel or other metals will not generally yield equally successful results when used on aluminum alloys. Quite good fused spots can be made with equipment that is not specifically designed for aluminum but, almost always, weld quality will be inferior, production slower and electrode maintenance cost higher. On the other hand, for the majority of aluminum welding operations it is not necessary to bring to the work equipment for the extreme precision and quality control that is required, for example, in the aircraft industry where the very highest degree of perfection is demanded.

A vast number of commercial applications of aluminum welding exist which do not require these extreme precautions because the consequences of achieving something less than 100 per cent perfection is less important.

This article is confined to procedures and practices which make for satisfactory aluminum welding on work that is not required to meet the extreme test standards of certain precision jobs, and which does not require the complex electro-mechanical control equipment that these jobs demand.

Surface Preparation — Fully 75 per cent of the

the "IFS" Out of

ALUMINUM WELDING

troubles with surface and weld "spitting", irregularity in weld shape and electrode "pick-up" in aluminum alloy welding can be attributed to improper surface preparation. Aluminum's characteristic affinity for oxygen causes it to become almost immediately coated with a thin, invisible film of oxide whenever it is exposed to moist air. On freshly cleaned aluminum this natural film does not cause high enough resistance to be troublesome from a spot welding standpoint. After a period of about 14 days, moreover, enough oxide will have been formed to set up a high degree of resistance to any further oxidation and this film will be of such thinness and uniformity as to provide only relatively low electrical resistance.

Nevertheless, it is important to remember that this satisfactory condition will not remain indefinitely and that aluminum will become unsatisfactory if exposed for long periods in shops where the atmosphere is dirty, the humidity high, temperatures excessive, or, if the material is subject to excessive handling. Storage of clean aluminum stock, then, is a matter to be taken into consideration if welding costs are to be kept down and maximum production efficiency maintained.

Problem created by the surface condition of uncleaned aluminum or aluminum alloy presents much more complex difficulties. Film oxide formed during the processing and heat treating of the sheet is much thicker, less uniform, and of high electrical resistance. Aluminum alloys 2S and 3S are usually received with fairly bright surfaces and the only cleaning involved may be to remove oil, grease or dust from the weld area. Other alloys (52S, 53S-W, 61S-W, 61S-T, 17S, 24S, 75S) require more thorough cleaning with fine steel wool, abrasive cloth, or light motor-brush. Alclad material also requires cleaning.

Generally speaking, the first place to trouble shoot where unsuccessful aluminum welds are obtained is on the surface of the material itself. A great deal of trouble, time and expense may be saved if close examination is made at this point and an immediate trial made with cleaned surfaces so that a comparison may be obtained. Three out of four times the trouble will have to do with the surface condition of the alloy.

Electrode Tips—If welds obtained on clean aluminum or aluminum alloy surfaces (assuming that the proper equipment is being used on the gage of metal) still are not satisfactory the trouble-shooter should turn his attention to the electrodes. Proper electrode shape is paramount for this type of welding. Function of the electrode is three-fold. First, it must properly conduct the electric current into the parts to be welded; second, it must exert sufficient pressure on the materials while the weld is being made; third, it must conduct the heat out of the metals to prevent the weld zone from reaching the outer surfaces.

One of the electrodes (at least) must be of such shape that a high concentration of current will be obtained in the weld zone proper. This electrode is usually dome shaped with a 1 to 4-inch radius, depending on the thickness of the material to be welded. The other electrode may be similar to the

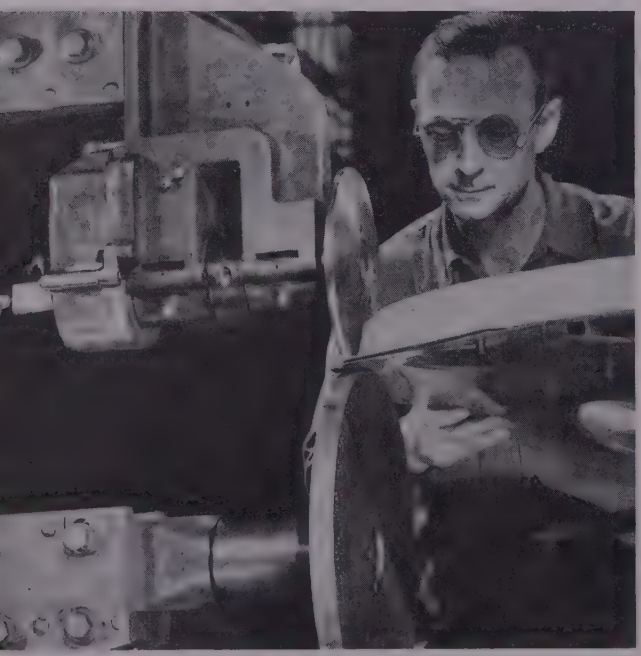
Fig. 2—One of the scores of resistance welding operations at Alcoa's New Kensington, Pa., plant

first. If the minimum of electrode marking is desired, however, a 12-inch radius electrode may be used on one side of the work with a maximum diameter of 1¼ inches, as further diameter increase will not further improve the appearance of the weld.

It is important that the electrodes be checked as to diameters proper to the amount of current carried without undue heating. A general rule is that 35,000 amp current requires electrodes of ⅝-inch minimum diameter. Higher currents or speeds require ⅞ to 1¼-inch diameters. Currents under 20,000 amp need only ½-inch diameters. Electrode sticking ("pick-up") is the result of the formation of an aluminum oxide coat on the face of the electrode. This cost lowers the electrical conductivity at the electrode tip and may result in melting the weld surface. Consistent dressing of the tip with a fine grade of abrasive cloth will prevent this "pick-up" formation from becoming a problem. Care should be exercised always to preserve the exact original shape of the tip, however.

Shop Practice — Certain improved shop practices have been developed through trial-and-error experimentation. These may prove of benefit to operators who have not had the opportunity to do a great deal of experimentation themselves. The first rule of good aluminum welding practice is that in all cases the production of sample welds is required. From the standard tables that indicate the proper settings and electrode sizes and shapes for specific gages and types of alloys, the operator makes his initial machine adjustments. It is only, however, after a trial run or two that the precise adjustments can possibly be determined. Exact determination of the quality of these trial welds is found by driving a chisel between the sheets near the welds, or by a "peel" test.

Each spot weld should pull a button of diameter equal to twice the thickness of the material plus 1/16-inch.



Sample weld distortions usually follow a certain pattern; that is, the welds would be quite satisfactory if only a certain number of changes were made. In general, what changes would clear up most aluminum spot weld troubles? (1) If spot diameter is too small it may be increased by increasing the welding current in small steps. (2) If expulsion of metal between the sheets is occurring, the welding pressure should be gradually increased until the expulsion stops. Check for dirty alloy surface.

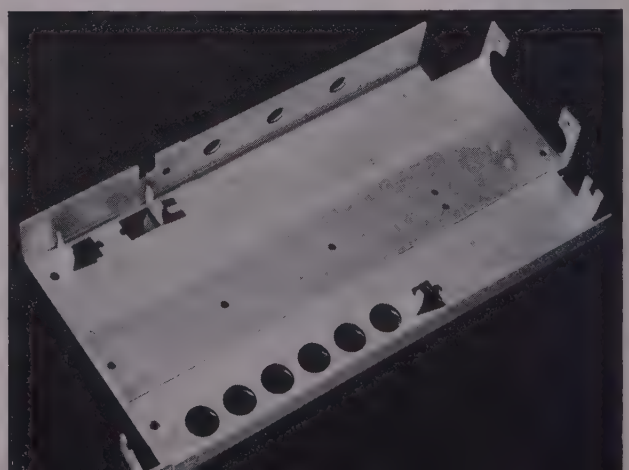
(3) If excessive darkening is seen on the surface of the weld, or melting occurs, or electrodes stick after only one or two welds are made, then either increase the pressure or decrease the current. Check tip contour. (4) If weld is too small, raise heat until either nugget is correct size or heat setting is 10 per cent above standard. If weld is still too small, reduce pressure 10 per cent below standard. If weld still remains too small increase time of current flow about 10 per cent above standard setting. (5) If weld is too large, proceed in the reverse sense of order above; i.e., first reduce heat, then increase pressure, finally reduce timing.

(6) If weld cracks internally, increase pressure and, at same time, increase heat or spot will decrease in diameter. If first test weld is not cracked but others are, generally the trouble is faulty tip cooling. Cracking can also be reduced by increasing the hold period which counteracts the shrinkage stresses by cooling the spot under pressure. (7) If spitting occurs, increase the squeeze period. In lighter gages this often requires a resetting to higher heat control and may result in hollow welds. Continued spitting may necessitate dressing of the tip shape which may be too sharp. If spitting persists at high current and high pressure levels, try the lowest permissible pressure with reduced current and highest permissible timing. (8) If irregular shaped nugget is revealed by peel or sheared tests, this is mostly due to a poorly shaped tip, poor cleaning, or severely worked material. Increased timing may improve weld shape.

(9) If proper spot size cannot be obtained after above corrections, increase the tip contour or radius slightly and increase both (*Please turn to Page* 56)

Fig. 3 (*left*)—*Seam welding aircraft assembly made of Alclad and other aluminum parts*

Fig. 4 (*below*)—*Instrument base, made of aluminum and assembled by spot welding*



SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

TWENTY YEAR CLUB: On December 15, I had the pleasure of being a guest at the annual dinner of the Twenty Year Club of Cone Automatic Machine Co., Windsor, Vt. This club was organized and is operated by the men and women workers of the company. The company management exerts no influence over this organization. At this recent meeting, Henry P. Chaplin, treasurer and general manager of the company, was initiated as a member and received his 20-year pin, along with veteran shop men.

To my way of thinking, this serves as a good demonstration of "industrial democracy" in action. This club, a number of whose members have been with the company from the time it was started by the late Frank L. Cone nearly 34 years ago, constitutes a solid core of common sense and loyalty. This surprisingly large group of veteran workers, having experienced the various ups and downs which the machine tool industry has experienced in the past 20 years or more, have done and are doing, a great deal in indoctrinating younger workers in the many highly specialized skills involved in the building of modern high production multiple spindle automatics.

Also, they indoctrinate the younger workers with the principles on which this company was founded and with the idea that only through the hard work and hearty co-operation of everyone in the company, has it been able to survive the "booms and busts" since 1916 and to become a well-known and important member of the American machine tool industry—despite its location in what otherwise would be an obscure Vermont village.

SPUR CENTERS: It is interesting to see the many techniques of production woodworking being adopted by machine tool builders now that speeds and feeds in machining metal approach those long in common practice in production wood turning.

In connection with the new Fay automatics developed by Jones & Lamson Machine Co., Springfield, Vt., for machining steel forgings at 1200 surface feet per minute, what our oldtime woodworking friend called the "spur center," is now playing a highly important role.

As in all super high speed machining setups, the problem of getting the work in and out of the machine quickly enough so as not to cancel out the time saved in cutting, loomed large. As far as driving the work is concerned, this was solved on a stem pinion job by a unique combination of a spur center at the headstock or driving end and a "dual pressure" live center in the tailstock.

The sharp blades which constitute the "spurs" in the spur center in this case, are "socked" into the pinion end of the forging by hydraulic pressure behind the tailstock center. High pressure is exerted momentarily to cause these blades to bite into the work to attain the driving contacts. Then this pressure is reduced to that required for holding the work firmly between centers during the cutting part of the cycle.

The amount of power transmitted through the five small blades of this spur center is amazing. The machine has a maximum of 66 hp, a goodly part of which is being transmitted to the workpiece when all nine tungsten carbide tools are in action. With the help of this system of work driving, plus transparent work guards which open and close automatically, floor-to-floor time on these automotive stem pinions has been cut to 17 seconds. Of this, the actual machining requires 8.5 seconds.

WHITHER MACHINE TOOLS: This being the last issue in 1949, it may be in order to wind up the year with a look ahead based on current trends affecting the machine tool industry.

On the swing around the New England circuit during which I have paused to write this, it is apparent that the machine tool builders could do with more business than they have right now. That is true not only in New England but in every other center of this highly centralized industry.

As far as volume of business is concerned things could be worse, but as far as earnings are concerned, the machine tool builders are not making the profits which they should make on the volume which they are doing. This is especially true in view of the tremendously valuable tool engineering and production engineering services which they are performing for their customers in the production metalworking industries—including the automobile industry. Also to be considered in this are increasing costs in machine tool building—including increased steel prices—and the modifications which more and more customers are demanding in so-called "standard machine tools." Hence my conviction that it is inevitable that machine tool prices must go up in 1950.

If that happens, modern American machine tools will still be by far "the world's best investment." Plans now being perfected for intensive sales campaigns throughout the metalworking industries will drive that fact home as it never has been driven home.

Machine tool salesmen, many of them graduates of the 1948 and 1949 sales refresher courses staged jointly by National Machine Tool Builders Association and American Machine Tool Distributors Association, will be conversant with "upstairs arithmetic" (tax and depreciation mathematics), as well as "downstairs arithmetic" (the dollars-and-cents values and the labor relations values) of the 1950 model machine tools and the tooling and materials handling attachments which will play such an important part in the 1950 production picture.

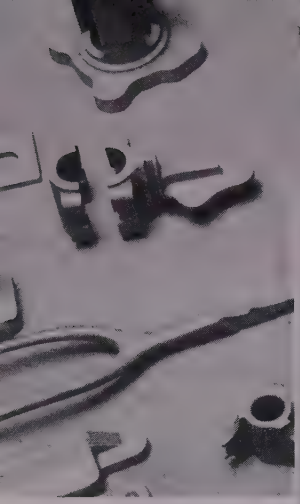


Fig. 1—Typical assortment of precision-cast steel parts, showing wide variety of sizes and shapes which can be formed to close dimensional tolerances, with no further finishing

Fig. 2—Touching up cavities in die in which wax patterns are injected. Dies are low melting point nonferrous alloy, with a steel back-up plate

Precision Casting Provides

LOW-COST PRODUCTION

. . . of small, intricate parts

PRECISION casting of metals by the lost-wax process offers peculiar advantages often not fully understood by prospective users, and involves manufacturing techniques strange to conventional methods. Although used for many years in dental manufacturing, the process found commercial awakening during the war in the making of jet engine and gas turbine components, where it furnished the solution to the supply of high-alloy high temperature resisting elements like turbine blades which could not be machined. Since the war it has gained momentum in other fields and future possibilities appear bright as more becomes known about design, production and application of this type of casting.

Most of the companies now busy in precision casting work are not foundries; they undertook the process as a corollary phase of some other activity. For example, General Electric and Allis-Chalmers (STEEL, June 7, 1948, p. 97) set up casting divisions to furnish blades for aircraft turbines they were building. Certain benefits would seem to accrue from an experienced castings manufacturer entering the picture in order that precision castings might be evaluated properly in respect to other types of castings—steel, malleable iron, gray iron, of the so-called garden variety produced in sand or permanent molds. This was done several years ago when Michigan Steel Casting Co., Detroit, set up a precision casting division which since its start has turned out over 900 different types of castings in varying quantities, in carbon, alloy and stainless steel. What follows will summarize experience and observations of this company as to properties and usefulness of precision castings, along with a review of the production technique it has evolved.

Production Steps—First step in the production of a precision casting is to determine how many are to be made in a mold. This may vary from six or eight up

By A. H. ALLEN
Detroit Editor, STEEL

Fig. 3—Assembling wax pattern. Main gate is held in a fixture while patterns in units of eight are assembled by pin and socket method

to several hundred, depending upon such factors as weight of metal involved, size of the mold, quantities required to be produced, etc. Once these items have been balanced against each other, work can proceed on the basic pattern. Each casting has its own pattern; when producing multiple castings the patterns are tied together with cross-bars and the necessary runner-cups, gates and sprues. Dies for injecting the wax patterns are cast and polished from a low melting point tin-bismuth alloy and are mounted in special types of injection machines, thermostatically controlled and pneumatically operated at high pressure. Component parts of a complete pattern are joined together by convenient pin and socket connections and by "welding". Waxes are blends of vegetable and synthetic materials, with suitable hardness and low coefficient of expansion.

Frequently, as many as 200 individual patterns are embodied in a single assembly. Jigs and fixtures are used for accuracy and speed, and the welding is done with spatulas either electrically heated or maintained at operating temperature in gas burners. Women have been found to have the requisite manual dexterity that is necessary for handling these precision operations.

The completed wax pattern next is dipped in a "primary" investment, the principal ingredient of which is colloidal silica, purchased in concentrated form and then mixed with silica flour, iron oxide, wetting agents, accelerators, plus a suitable amount of water to make the "slurry" of proper consistency.

Secondary Investments—Some types of secondary investments include alcohol and tetraethyl silicate mixtures which are flammable. The adoption of a water-base investment eliminated this hazard. The investment is agitated constantly through the dipping operation which builds up a retained wall of investment 0.004-0.007-inch thick, conforming to the most minute detail of the wax pattern and eventually forming the glass-smooth inside surface of the mold. The outside of the dipped investment is coated with a coarse grain silica sand to provide a rough surface which will yield a good bond between primary and secondary investments.

The coated pattern assembly, pouring cup down is set on a steel plate and a mold flask of heat-resisting alloy is placed over the assembly and sealed to the plate with wax. Flasks may be round, oval or rectangular with rounded corners. A heavy paper collar is fitted inside the top of the flask so that the level of secondary investment may be brought well above the top line, assuring soundness of the material in the steel flask. Eventually this paper and the investment contained in this section is cut off from the flask, flush with the top.

The secondary investment is a relatively coarse mixture of silica, calcined clay and liquid binder mixed to a consistency which permits pouring it into the flask as it rests on a high-frequency vibrating table. As the table vibrates, the investment settles securely

around the pattern assembly and gels in approximately 90 minutes. The steel plate then is removed and the mold, still cup downward, is placed in a grid which conveys it through a drying and dewaxing oven where the wax of the pattern melts and drains out, later to be reclaimed. Four trays or grids, each carrying four rows of molds are carried on a wheeled truck into and out of the oven.

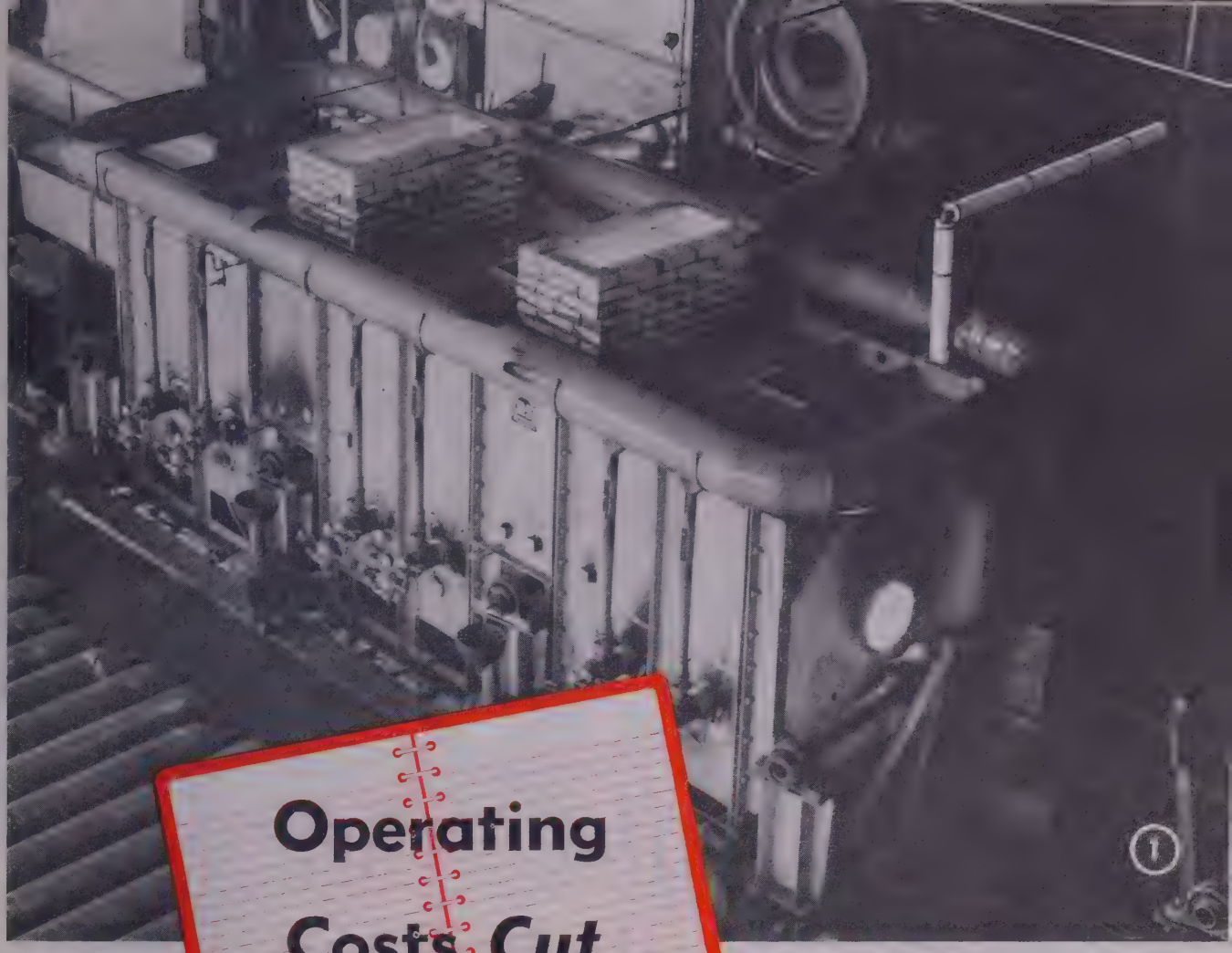
Molds Preheated—Before pouring, molds are preheated to 1600°-1850°F in a specially constructed gas-fired heating furnace which is adjacent to the discharge end of the dewaxing oven. Preheat temperatures vary slightly depending upon the nature of the casting and the casting characteristics of the metal being poured. Directly opposite the heating furnace are six casting machines, essentially small steel-encased crucibles with steel plate tops in which pouring holes are bored slightly off-center to the front. The crucibles are mounted on trunnions to permit them to be inverted quickly when the inverted mold has been positioned over the pouring hole and locked in place by means of two side rods and a cross bar, the latter being quickly locked down tightly against the bottom of the mold.

Fig. 4—After primary investment has dried, pattern assembly is positioned in a flask prior to filling with secondary investment

Crucibles actually are pressure-type indirect arc furnaces, the pressure coming in the form of 3 to 10 pounds of air introduced through the trunnions automatically when the furnace is in the inverted position. Charge in each furnace is calculated carefully so that at the moment of pouring there will be just enough metal to fill the mold. Melting stock is produced in 1000-pound induction furnaces to insure close control of chemical analysis. An asbestos seal ring or washer is placed between the pouring cup of the mold and the spout of the casting machine. Operating cycle is rapid, each machine casting upward of 75 molds per 24-hour day.

After cooling, the molds are shaken out pneumatically and the spent investment is reclaimed, being mixed in specified proportions with new material. Gates are cut from the castings by friction-type bandsaws, using a wavy-edge blade, these having replaced former rubber bonded abrasive disk wheels, resulting in higher speed (*Please turn to Page* 67)

Fig. 5—General view of casting department. From left to right, operators are removing mold from drying oven, lifting mold from preheating furnace, checking temperature of melt in indirect arc furnace by optical pyrometer and preparing to invert crucible after mold has been clamped in place on top



Operating Costs Cut

Fig. 1—Entering end of heating line from overhead crane, with bank of truck cylinders awaiting processing

. . . and efficiency improved by normalizing procedure used in the manufacture of high pressure gas cylinders

By L. E. BROWNE
Associate Editor, STEEL

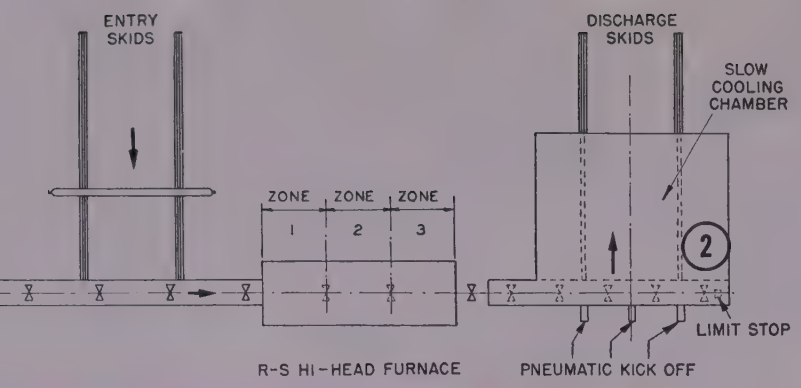
ADDED efficiency and lowered operating costs are currently being achieved to a remarkable degree as a result of normalizing procedures followed by Taylor-Wharton Iron & Steel Co., in its production of truck type, high pressure gas cylinders. Methods used by the company revolve about a high thermal head normalizing installation developed by R-S Products Corp., Philadelphia.

Truck type cylinders produced at the Easton, Pa., plant consist of long lengths of heavy-wall seamless tubing, forged to almost complete closure at each end after the manner indicated in Fig. 4. As can be seen, the metal section is almost doubled in thickness at the ends or "necked" sections.

Until the purchase of the new furnace equipment, these cylinders were normalized after forging by stacking approximately 20 cylinders on each of two oil-fired car-bottom type furnaces, heating to 1700° F and then unloading the cylinders singly by overhead crane to a cooling bed for slow cooling in air. Fuel consumption averaged 5½ million Btu per net ton, and six men were required for loading and unloading the furnaces. It was also necessary to have an operator start up the furnaces 3 to 4 hours before each heat in order to have them ready at the beginning of a regular shift.

Metallurgical results from this method of treatment were fair, but it was recognized that better physical characteristics would be secured if the uniformity of heating could be improved and metal temperature controlled at a point closer to the actual critical point. Critical point of the steel now used is 1410° F.

Heating Rate—High thermal head heating is not new. It actually takes place during the initial portion of most heating cycles, as may be seen by examination of the typical time-temperature heating curve shown in Fig. 3. It is apparent from the conventional curve



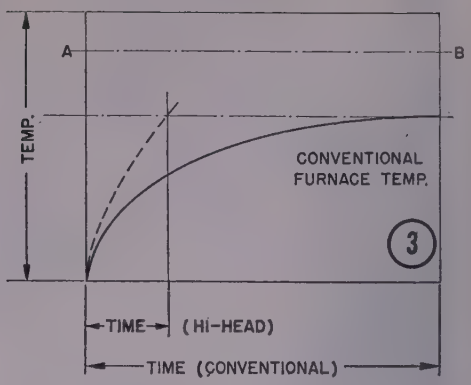


Fig. 2—Layout of heating equipment. Cylinders are placed on entry skids by overhead crane and roll forward by gravity to power-driven rollers feeding charge end of furnace

Fig. 3—Typical time-temperature heating curve; conventional curve (heavy line) indicates maximum rate of heat transfer occurs at start of heating cycle. Transfer rate progressively declines as work temperature increases

Fig. 4—Truck type cylinder of heavy wall seamless tubing forged to nearly complete closure at each end with metal section nearly double thickness at ends

(heavy line) that the maximum rate of heat transfer occurs at the start of the heating cycle, and that the transfer rate progressively declines as the work temperature increases, until it almost ceases as the work temperature approaches furnace temperatures.

Fast rate of heat transfer at the beginning of the conventional heating cycle is due to the high thermal difference or "head" between the comparatively cold work and the hot furnace. The method makes use of this effect over the entire heating cycle instead of just at the beginning.

If the furnace temperature is raised to a higher level than normal, as indicated by line AB, the work temperature curve becomes much steeper (broken line), because the transfer rate has been increased by using a higher head. Heating time is therefore shorter, and is limited only by the ability of the work to absorb heat safely, and by the practical limits of furnace refractories. It is obvious also that the work must be removed from the higher furnace temperature before it is overheated, and that very uniform heat application will be required. These conditions have been satisfactorily met with this type of equipment.

Automatic Controls—Cylinders are at room temperature as they enter zone 1 of the furnace; automatic temperature control maintains this zone at a temperature of 1950° F which is 500° higher than the desired 1450° F final work temperature. Temperature is also automatically controlled in zones 2 and 3 with approximately the same amount of thermal head. The resulting fast heating due to this thermal head is over 4½ times faster than conventional heating practice, and temperature uniformity is much better.

Cylinders leave the furnace at a temperature of 1450° F which is only 40° above the critical point instead of the 290° differential which existed with the old method of treatment. Metallurgical properties are of course substantially improved by this close control of temperature. It is interesting to note that the cylinders are considerably longer than the length of the heating chamber and that when the leading end of the cylinder is up to temperature, the trailing end has not yet entered the chamber.

The cylinders then pass into a lightly insulated cooling hood, from which a pneumatically operated kickout, actuated by a limit stop, moves them broadside on skids to the discharge point.

Only one operator is required for the line, and his duties consist principally of occasional checks on temperature and general observation. A continuous record of final work temperature is made by means of an open-end, radiation type thermocouple at the discharge end of the furnace. The record thus provides an individual curve for each piece processed.

30 Minutes to Temperature—Because of the small bulk of refractory used in the furnace construction, only 30 minutes is required to bring the unit to temperature after an overnight shutdown. Fuel consumption has been reduced to 1,150,000 Btu per ton including heating-up time. Work is heated so rapidly that practically no scale is formed on the surface of the steel, and the lack of scale reduces the time required for subsequent cleaning operations.

The unit is completely equipped with automatic temperature controls as made by Brown Instrument Co. Standard Hauck low pressure oil burners using No. 3 fuel oil and 16-ounce combustion air supplied by a Spencer turbine, fire tangentially into cylindrical heating chambers, completely enveloping the work in a high velocity bath of hot gases. When no work is entering the furnace, an electric eye automatically closes the temperature control valves to a preset minimum for fuel economy. Safety shutoff protection is provided to close the fuel line in the event of air or oil pressure or electric current failure.

This process is applicable to the heating of billets or bar stock for rolling or forging, and to the heat treatment or normalizing of bar or tubular stock as well as the application described herein. Patents are now pending on the furnace construction shown.

Fig. 2 shows the Taylor-Wharton layout in outline. Fig. 1 is a view from the overhead crane showing the entering end of the heating line.

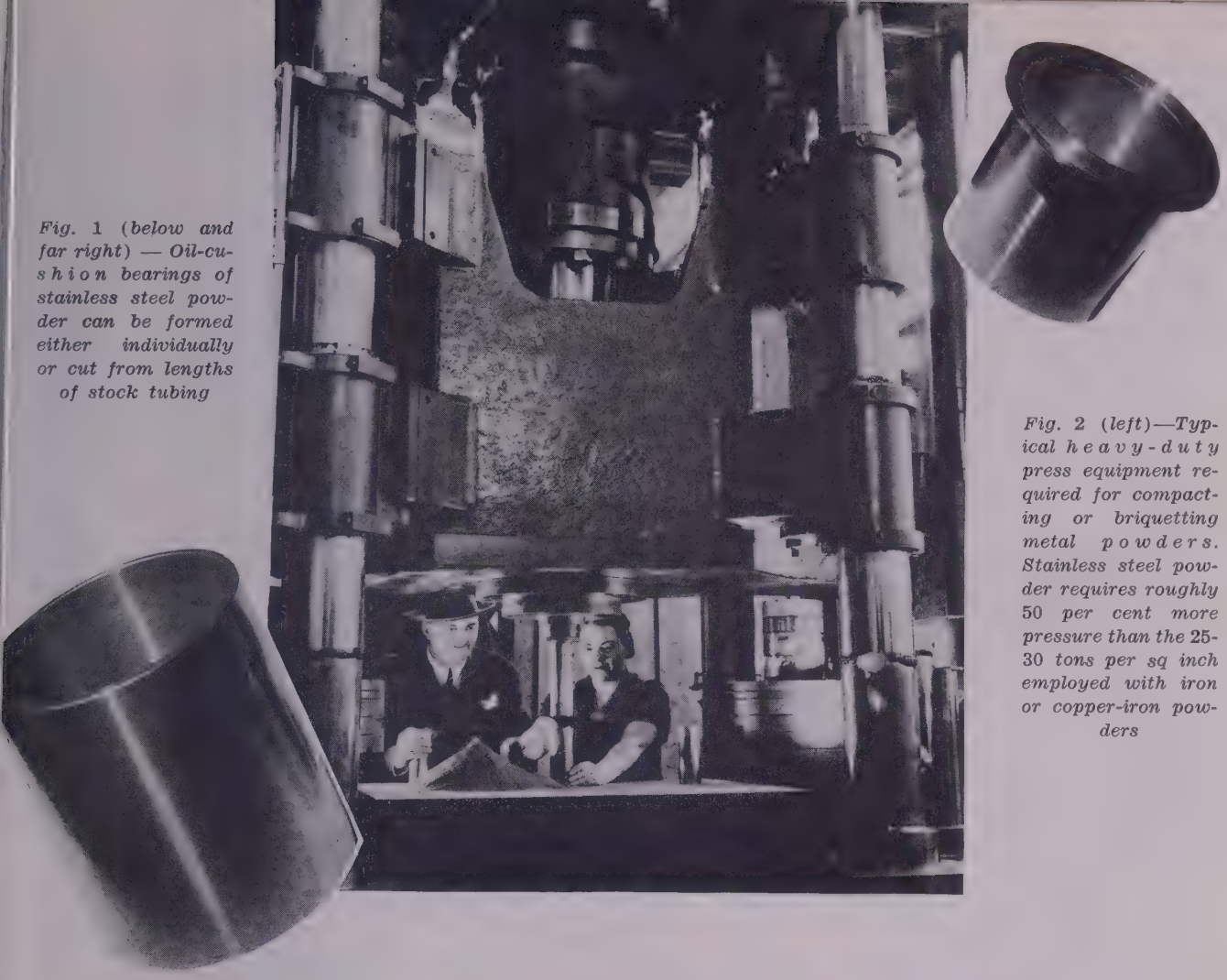


Fig. 1 (below and far right) — Oil-cushion bearings of stainless steel powder can be formed either individually or cut from lengths of stock tubing

Fig. 2 (left)—Typical heavy-duty press equipment required for compacting or briquetting metal powders. Stainless steel powder requires roughly 50 per cent more pressure than the 25-30 tons per sq inch employed with iron or copper-iron powders

FINISHED STAINLESS POWDER PARTS

. . . mass-produced in wide range of shapes and sizes

MASS production of finished machine parts from stainless steel powder, in a wide range of sizes and shapes, recently undertaken by the Amplex Division of Chrysler Corp., Detroit, appears to open up an entirely new and interesting range of applications where cleanliness, noncontamination, noncorrosive qualities, service without attention and long life are requisites. Gears, levers, cams, blocks, gibs, pulleys, ratchets and intricate structural parts which might be difficult to produce economically by machining from solid bar stock, lend themselves ideally to fabrication in stainless steel powder. In the marine, pharmaceutical, chemical, medical equipment, food processing, paint and other fields where corrosion resistance is a primary factor, numerous possibilities are seen for the new material.

No. 302 Stainless—First parts to be produced were of No. 302 stainless steel, the 18-8 chrome-nickel variety. The powder itself is purchased from a New York metal powder manufacturer in finished form, and is produced by a chemical process which differs from the normal manufacture of metal powders. Generally powders are made by an electrolytic method, by oxide reduction or by decimation with air, etc. Original material from which stainless powder is produced is sheet stock on the order of 16-gage, and may be in the form of trimmings or scrap from blanking operations. After chemical treatment, presumably in some acid or acid mixture, the metal actually resembles a strip of rubber, being that flexible. It has a porous appearance, the surface being quite rough.

According to a statement by A. J. Langhammer, president of the Amplex Division, the chemical

reagent that is used attacks grain boundaries, dissolving them so that the isolated grains or crystals can be crumbled readily and separated into powder form. Grains vary in size, and by screening the desired mesh is obtained. Normal range in which Amplex is working is from 150 mesh to micron (0.000001-meter) size. Unit particle shape is irregular and, when properly prepared by the powder manufacturer, makes for ready compacting.

Manufacture of parts from the powder involves the normal operations of mixing, briquetting, heat treating (sintering) and sizing. Compression ratio for initial compacting is approximately 2 to 1 and, since the material is much harder than copper or iron powder, higher unit compression can be used. This runs to roughly 50 per cent beyond the 25-30 tons per square inch used for compacting parts of maximum density in conventional iron powder. The higher pressures required by stainless naturally make for greater wear on all dies and punches, with resulting shorter life in general.

Higher Sintering Temperatures—Somewhat higher sintering temperatures also are required by the stainless compacts. After final sizing hardness is in the neighborhood of 72 Brinell.* In machine parts the tensile strength averages around 33,000 psi, accompanied by favorable ductility. For example, a thin wafer or disk, possibly 1/32-inch thick, can be bent double on itself without fracture. Specific gravity of machine parts is 6.7; weight 0.242-pound per cubic inch. Parts can be machined readily, including not only such operations as boring, turning and facing, but also knurling and threading. They may be polished to a bright luster if desired.

Considerable flexibility in end products is available by limiting the degree of compacting. By reducing the pressure, it is possible to make a variety of types of filters, ranging from pores of very fine size to medium or coarse, depending upon the requirements of the application. Filtering, separating, diffusing and regulating the flow of a wide variety of liquids and gases appear feasible. The material also may be formed into tubing of different diameters and wall thicknesses, that are suitable for oil-cushion self-lubricating bearings.

A number of machine parts have been supplied the armed forces for undisclosed applications but probably as components for mechanisms requiring advanced duties, where high loads and temperatures, as well as corrosive gases and liquids, are involved. In one instance it was reported a part provided 300 per cent greater duty than the normal material.

Another early application was a small cam, only about 1 inch long, for an application in which contamination could not be countenanced. Other small parts, one numbering 10,000 to the pound, have been produced, and the company recently quoted on a part having 24 square inches of surface area. Equipment is available to produce even larger pieces.

Aluminum Welding

(*Concluded from Page* 48)

pressure and current by a small amount. Continue this series of adjustments until proper size is obtained. Poorly shaped spots are often due to the radius being too large, tips not in alignment, or the flat tip being concave or convex. Check all these points. Check also the proper vertical position of the holders. Improper electrode position results in a slippage of the spot. This is corrected by dressing the tip properly. On thin gages using spherical tips, watch for the development of a flat spot at the apex. Consistent dressing will prevent this.

Character of Tips—A general rule for checking thin gage work is to pay constant attention to the character of the tips. Spherical tips have a tendency to form flat spots which, in turn, create a hollow weld or ring weld. Twist tests should be made on thin gage weld samples.

Too many instances recorded in which attempts to secure satisfactory results from the operation have been abandoned simply because not enough attention was given to basic resistance welding fundamentals. Resistance welding of any metal is simply the most modern application of the ancient art of forging in which the three variables still remain: (1) Character and thickness of the metals; (2) amount of heat to be applied; (3) amount of pressure exerted. In the process we simply substitute heat generated by resistance to an electric current for that formerly created by the old forge and we exchange for the blow of the hammer and the inertia of the anvil, the pressure created by hydraulic or air rams.

Low Carbon Stainless Developed

REDUCTION of a carbon content in stainless steel to a maximum of 0.03 of 1 per cent, while maintaining the 18 per cent chromium-8 per cent nickel content, has resulted in a new material to resist industrial corrosion. The carbon reduction was made because when chemical corrosion of stainless steels is encountered, much of it centers in deposits composed mostly of carbon, between the microscopic steel grains.

In an effort to combat the industrial corrosion problem, Carnegie-Illinois Steel Corp., Pittsburgh, began investigation in 1939 to determine a practical means to produce chromium-nickel stainless steel on a production basis with the lowest possible level of carbon. Along with the development of the new manufacturing technique, extensive corrosion testing programs were set up in the company's laboratories and in those of principal users of this type of steel.

Boiling of test samples of the new type of steel in 65 per cent nitric acid for 240 hours is said to have shown no corrosion between the grain. In another test, samples were boiled for 500 hours in copper sulphate and sulphuric acid, again with no corrosion problem. The acid tests were made after the steel had been heat-treated at temperatures ranging from 1000 to 1625° F. These tests were prescribed by metallurgical authorities as a qualification for material for corrosive conditions which prevail in some industries.

A decade has been required to prove that the manufacturing methods are economically sound and to accumulate enough corrosion testing data to justify acceptance of low-carbon stainless steels for many applications in which stainless steels containing columbium or titanium combinations are used, the company states. On the basis of established acceptance standards, the testing program has shown that the low carbon 18-8 steels have a resistance to intergranular corrosion equivalent to that of stainless steels to which these materials have been added.

Confirmation of these results has been received from welding tests. It has been demonstrated that the low-carbon 18-8 materials may be substituted for stabilized types for such applications as welding which involves short heating times at elevated temperatures. Other test reports on subjection to tensile, impact and other physical tests and a comparison of mechanical properties show the new low-carbon stainless steels to be comparable to the higher carbon grades.

Left—5 of the 55 pieces of luggage in the smart Samsonite line. All are now equipped with lustrous, solid brass fittings to make Samsonite Luggage look better longer.

Samsonite Luggage

SWITCHES TO SOLID BRASS FITTINGS . . . TO MAKE THE "WEAR SPOTS" ON ITS LUGGAGE STAY SMARTER LOOKING LONGER.

Revere Brass Strip selected for its unusually fine, uniform grain after hardware is formed.

● The name Samsonite has become synonymous with quality luggage the country over. It has a reputation to uphold. For that reason, when the brass plated fittings with which this luggage was initially equipped, started to tarnish and show signs of premature wear, the Samsonite people did a double-take. After consulting with their own engineers and the Revere Technical Advisory Service it was decided that nothing less than solid brass would be in keeping with so fine a line of luggage. Revere Brass Strip, because of its very fine uniform grain, was selected for the job.

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NUMBER **18** OF SERIES

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By KENNETH B. LEWIS
Consulting Engineer
Worcester, Mass.

Production of WIRE AND WIRE RODS

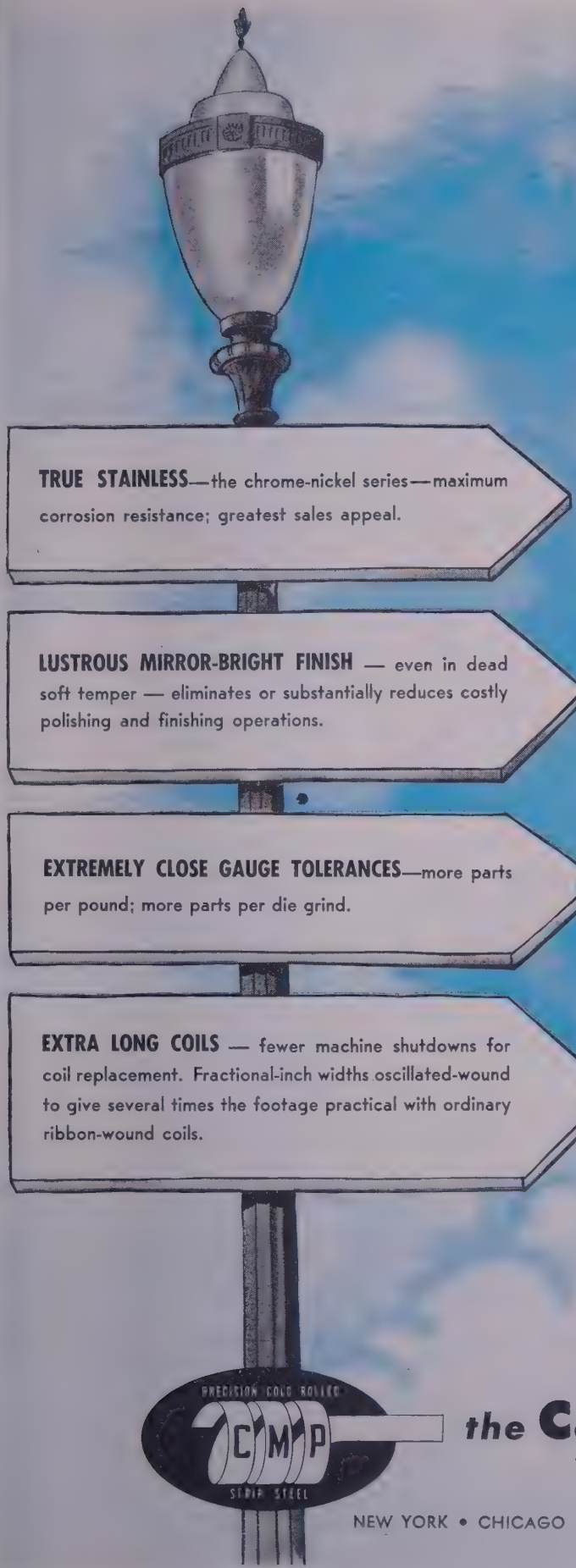
The author comments on the product's historical background and describes various processes and equipment used in the manufacture of wire from antiquity to the present day

THE WIRE of antiquity, chiefly of the soft metals, and primarily made for purposes of ornamentation, some of which has survived to our day, bears evidence of several methods of production. It was clipped from thin plates and rounded up with hammer, file, and polisher, or was rolled-up from thin foil, and in either case short pieces were brazed together to get workable lengths.

Extrusion through a die seems to have begun only about a thousand years ago. The raw material of ferrous wire was wrought iron, the product of any of several processes of direct reduction without fusion, drawn out into bars by hammering. The die, described in contemporary manuscripts, seems to have been of the same appearance as the steel die that has been so recently supplanted by those of sintered carbides of the rare metals, and the power was that of human muscles, sometimes direct, sometimes compounded through simple leverage. The scaly surface of the bar was cleaned by rubbing with sand, or with bricks, and the friction between wire and die was qualified by draping an oily rag on the strand back of the die.

The means of applying power caused drafting to proceed by short repeated strokes, the tongs gripping again every few inches, and the product, when repeated drafts had elongated the original bar sufficiently, was coiled up by hand. When the wire became small enough the end was attached to a rotatable drum which one or two men could crank over, windlass fashion, thereby supplying the power and coiling and storing the product at the same time. The wire in its early stages was in short pieces and marred by tong marks; however, this was of no particular disadvantage since it was merely a semiproduct. Before it reached marketable gage, for sale as material for textile cards, needles, pins, fish-hooks, eyelets, and the like, it had acquired both length and smoothness.

Fig. 1—View of continuous rod mill, furnace, and flying shear



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The author, Kenneth B. Lewis, was educated in the public schools of Quincy, Mass., and at Harvard University, where he became interested in metallurgical and metallographical work, under the direction of Professor Sauveur. After receiving his degree in 1904, he went to work at the Bethlehem Steel Co. After a short apprenticeship in each department, he settled at the open hearth furnaces where he worked through each job from third helper to assistant superintendent. After four years experience, he resigned and went to research department of American Steel and Wire Co. at Worcester, Mass., becoming engaged in experimental work connected with the development of new processes, investigations into causes of faulty wire, etc. In 1909 he joined the staff of Morgan Construction Co., Worcester, Mass., where he took charge of the wire drawing machinery department. After 25 years at this post he became a consultant in steel wire affairs which activity he has followed for the last 16 years.

Mr. Lewis has been a steady contributor to the technical press both here and in England and translated and published Bonzel's "Le Trefilage de l'Acier." He was one of the small group of men that founded the Wire Association in 1930 and in 1941 was the association's Mordica Memorial lecturer.

Six hundred years ago the power of falling water was harnessed to wire machines. The cams on waterwheel shafts replaced human muscles and weight in operating the drawing levers, after which for another 500 years wire machinery advanced only as it shared in the slow progress of mechanical development in general. Hand hammers gave way to fast trip hammers actuated by water power, and the wire rods could then be forged faster and in longer pieces. Gears crept into use to drive the small drums. A whole series of advances in the production of the raw material ensued. Modification of the smelting technique gave the industry cleaner iron in larger pieces. Rolling mills crept in, first for the flat products only, and the wire makers began to experiment dangerously with bars which had been rolled as flats, slit in collared rolls, and rounded up under hammers.

Reduction in section by the use of grooved rolls came in, and was applied in various ways to the production of wire rods; later three-high operation, followed by the associated alternate two-high and looping, pleased the wire mills no end. The wire rod, having started off as a ½-inch bar weighing about 2 pounds, had become, a century ago, a thin rod of a diameter approaching ¼-inch and weighing approximately 14 pounds. The length was so great that it had to be coiled for delivery, and hand cleaning was superseded by a trip through the tumbling barrel containing sand and water. The mechanism that drew the early drafts was repeatedly improved so as to draw longer strokes, and rods were drawn right onto revolving drums.

Just about 100 years ago the wire industry passed through its second revolution. The first, the application to wire drawing of external power, was about 1360. The second is harder to date with precision, as it echoed and re-echoed around the world like a long roll of thunder, but 1845 to 1870 may be considered to cover it, with the hot decade from 1855 to 1865. It was sparked by the electric telegraph, which brought the first insistent demand with tonnage implications for long, smooth, flawless pieces of coarse wire. Like a chain reaction a number of latent ideas blossomed into practice.

Most impressive novelty was George Bedson's continuous rod mill, not merely because it gave a 40 to 50-pound bundle of small gage rod, but because its principle promised to remove all limitations on gage and bundle weight. Mills of the looping type, meeting the challenge, were speeded up and refined. Rod bundles were now too large to be handled safely in the tumbling barrel, and acid pickling came in, sulphuric acid having conveniently dropped in price due to new manufacturing techniques. Several processes hitherto performed awkwardly on small bundles, now became strand operations, notably galvanizing, tempering, and patenting, all of which were vastly improved thereby. All straightaway drawing stopped.

This revolution left the mills very much as our generation found them, say 30 years ago. A third

Fig. 2—Roughing and intermediate trains with looping floors of a continuous rod mill

revolution has now supervened; it may be still in progress, and is therefore hard to evaluate, but it appears to have started about 1918 with the adoption of inhibitors, which supressed noxious fumes and obscuring vapors in the cleaning house and led to the more satisfactory cleaning of rods. This smoothed the path of the continuous wire machine, which drew as a single process many of the drafts formerly performed as single operations, thereby vastly reducing handling costs. Continuous drawing encouraged higher speeds which led to artificial cooling; it also put a premium on bundle weight and led to butt-welding and nonstop operation, and this in turn smoothed the path of a new development, perhaps the most potent of the series, the carbide die. These advances have, collectively, greatly improved wire surface, narrowed tolerances, cut die costs, and quadrupled output per man.

Coincident with the advance in the actual drawing of wire have come changes and improvements in such ancillary operations as cleaning, coating, baking, annealing and galvanizing.

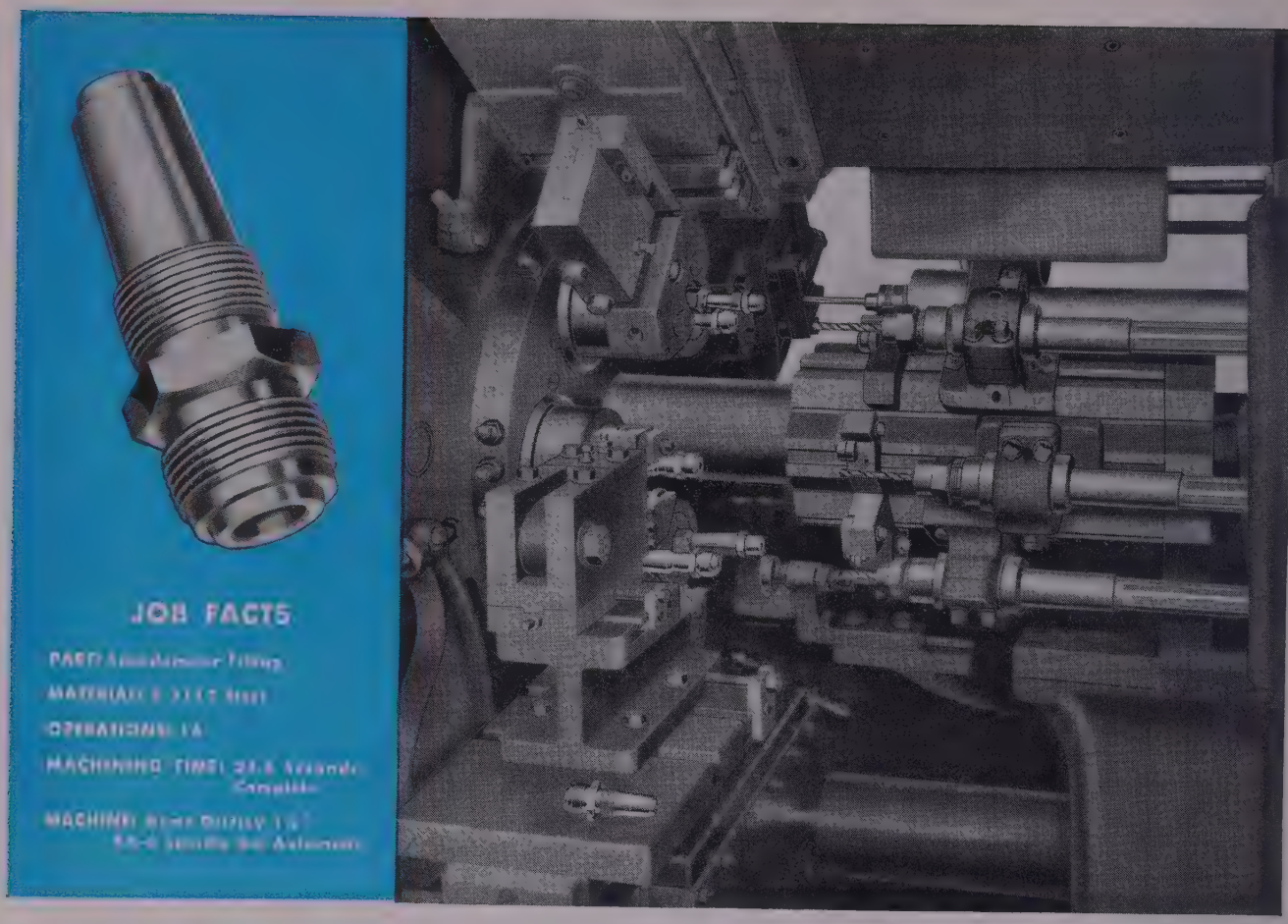
Against this historical background the details of wiremaking will be examined one by one in their modern form.

The story of the wire rod is interwoven on the one hand with that of rolled products in general, on the other with the wire saga. Rods and wire have inter-acted on each other from the start, now holding each other back, now stimulating adventure, first one then the other in the lead. The early origin of the wire rod lies patent in its name; it started as a rod, a short, straight, thin bar of wrought iron. It was forged by hand, then by power hammer; it was slit by collared rolls from a hot-rolled flat. It was perhaps the earliest of the products of the grooved roll, first of the two-high stand passed back over the rolls after each reduction, then of the three-high stand, worked on both passages, growing steadily smaller in diameter and longer as the speed of rolling crept upward.

Most authorities date Cort's introduction of rolling in grooves as 1783 and John Fritz's "invention" of three-high rolling as 1856. A Mr. Fleuer was rolling rods in grooves in various combinations with slitting, in France in 1728, and hinted that he learned it from his father, while a drawing and report by Karstens dated 1828 shows a three-high stand linked to alternate two-high stands in a fashion that spells nothing but looping. Such re-discoveries are common place in wire history. Ichabod Washburn is generally credited with having introduced the rotating wire block for rods, but Fleuer was roughing down rods on rotating blocks a full century before Deacon Washburn had turned his attention to wire manufacture. Countless advances of this sort were conceived, tested, found to be ill-timed, and dropped.

About 100 years ago the wire industry was under pressure, as previously stated, to do a better job for the electric telegraph; both the rod and the wire branches were involved. Advances in rod practice led the way. There was a speeding up of rolling trains so that the rods, despite the long loops that lay cooling on the floor between passes, might be rolled in longer lengths, but the dexterity and endur-

Fig. 3—Four-strand finishing mill showing repeater troughs



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ance of the operators, who caught and re-entered the flying ends of the rods, set a limit to speed. Into this situation came the continuous mill, first designed in England by George Bedson. He placed the stands in tandem, one for each draft, speeded exactly to compensate for elongation, and in deference to the fact that deformation in rolling acts in only one plane he used alternate vertical and horizontal rolls. Crude as was this first mill, it proved that limits to speed, weight of billet, number of passes, and size of product, had definitely been removed.

Refinement was all the new mill needed, and refinement was soon forthcoming. Washburn & Moen bought a Bedson mill, (the price, by the way, was £1000) and set it up in Worcester. Their chief engineer, Charles Hill Morgan, increased its output by providing a continuous furnace and automatic reels, and when another such mill was projected he decided to rid himself of the nuisance of the vertical rolls, from which scale dropped straight into the bearings and gears, by setting all stands horizontal and using twist guides to turn the billet on edge between passes. The resulting mill soon shook down to something relatively standard; a billet size of 1¾ inches square and 30 feet long, fourteen tandem passes, a finishing speed of about 3000 feet per minute, and a rod of the familiar No. 5 gage (0.207). This rod size became so firmly fixed into the structure of the industry that smaller sizes are seldom rolled.

The mill just described has been known to three generations as the Morgan mill, and although others have now mastered the techniques of its design, the name has come to stand for a type. During its evolution the conservative school of thought was represented by mills which have come to be associated with the name Garrett, because of the engineering firm of Garrett & Cromwell by whom so many of the type were designed and built. These mills, developing out of the old "Belgian train" of equally speeded stands, were characterized generally by a three-high rougher taking a billet at 4 x 4 or 5 x 5 inches, and finishing and intermediate trains broken into several separately speeded groups. Its advantages were, as contrasted with the continuous mill, a billet that could be economically produced direct on the blooming mill, a lower first cost, a good section, some flexibility, and a light scale on the rod. Its weaknesses were hand operation, necessity of a large crew and spell hands, all highly skilled and generally well organized for extortion, small bundles, and, because of long loops, a cooling of the last end which usually sprung the rolls and gave a larger gage there.

Rod mill building was greatly stimulated about the turn of the century, during the combing out of independents when the U. S. Steel Corp. was in process of formation. Many mills of both types were built, but the cream of the business fell to the continuous mill, which made no demands on endurance or dexterity, and could be set up and operated by good general mechanics. Messrs. Garrett and Cromwell have passed on, and their mills are no longer built, but during the struggle between the two types, each borrowed from the other. Garrett adopted the continuous roughing train, and continuous furnace, and broke up the finishing train into smaller sections for better loop control. Morgan dropped the straight tandem arrangement and went to a modified Garrett finishing train but with absolute loop control, added strands, and trended toward bigger billet sections. The rod mills of today, by whomsoever built, conform to this general description, with variations to suit each particular case.

The Morgan type, starting as a single-strand mill, quickly went to two, and now is available as a four-strand unit. Billets range up to a 2¼-inch square piece 40 feet long, with correspondingly heavy bundles. As many as 21 stands have been supplied, and the finishing speed has reached 4500 feet per minute. Such mills can roll at the rate of 50 tons per hour, and often have ancillary equipment to permit the production of a range of merchant bar shapes and concrete reinforcing bars. Most of their features are now common to all modern rolling mills; wherever originated, they have passed into our common stock of knowledge, and rate no detailed description in this presentation.

A long path stretches from the short, rough forged ½-inch iron bar, laboriously freed of oxide by scraping with a half-brick, to the 3000-pound hair-pin load of No. 5 rod placidly soaking in the hot acid bath. The earlier job was reserved for old women and children; later, when rods were coiled in 10 to 14-pound units, these were tumbled in the barrel with sand and water. It was one of those lucky breaks of which industrial history is so full that in the eighteen sixties, when rod bundles had become so heavy that they would have tangled hopelessly in the barrel, sulphuric acid, long known as a good cleaner and commonly used for sheets but too costly for wire, began to drop in price. The sulphide ores of the soft metals began to come eastward from Colorado and Nevada to be smelted on the Atlantic seaboard, and acid was recovered as a by-product.

Chemistry of the cleaning process is not complex. The oxides are mostly insoluble, but the heat of the steam-agitated bath expands the scale away from the steel; it cracks, the acid creeps in and works on the steel, hydrogen bubbles form, and push the scale off. The concentration of acid is 8 to 10 per

Fig. 4—General view of looping stands with enclosed finishing stands

cent, the temperature of the order of 165 degrees F. As the solution builds up in iron the action slows down, and for the sake of holding to a uniform cycle the temperature is gradually raised, until, with a low acid content and high iron, the bath is finally discarded. Until 30 years ago the cleaning house was a "hell-hole" of biting fumes and blinding vapor, and the achievement of a job half way between the extremes of scaly and of over-pickled rods was a minor miracle, but now, thanks to a group of additives, chiefly nitrogenous in character and mysterious in action, the acid works mainly on the FeO which it dissolves without evolution of gas, and after a brief etching of the underlying steel it stops its attack.

Acid brittleness is still a hazard, though now comparatively a minor one. It is caused by nascent hydrogen which enters into solution in the steel, from whence it can be routed by some combination of time and temperature. The amount of hydrogen that can be absorbed in this way is incredible; experiment easily proves that steel can take up its own volume of the gas without visible change. This hydrogen must be driven out before the first draft, or it is permamently fixed and will, in some cases, make the steel as hard as glass and as brittle as a dry stick.

When the scale is gone the rods are rinsed in water, generally a high pressure stream, and may, for some purposes, be let stand in a soft spray or fog of cold water where it develops a soft moist hydroxide coating known as a sull coat. It is then dipped into a thick emulsion of lime (about 6 per cent) at high temperature and promptly baked. The lime entangles with the sull coat, either the coat deliberately induced or the lighter coat that forms automatically and instantaneously after the rinse. Fatty substances, usually powdered soap, used for lubricating purposes, are entrapped in the rough surface of this lime coat as the wire enters the die, and combine with it to form a plastic film which is indispensable in dry drawing. Baking serves to dry the wet lime before it can rust the wet rods, and also to condition the lime for its duty as a carrier for the soap.

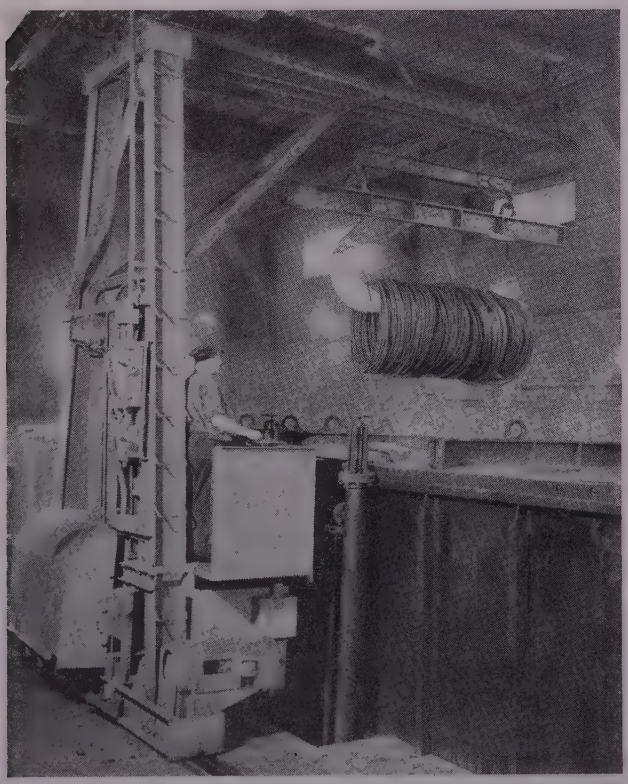

Fig. 5—Modern cleaning house showing rubber-lined acid tubs and gantry crane. Cleveland Crane & Engineering photo

As to baking, for the 80 odd years since baking came in, for it was unnecessary until bessemer steel supplanted wrought iron, rods were baked on trucks, or on pegs in the walls of chambers ranging from 100 to 400 degrees, and for intervals from 24 to 2 hours, time coming down as temperature went up. In 1936 the present writer, having seen each increase in temperature and velocity of the baker atmosphere reduce the baking time, tried 750 degrees F and a blast of cyclonic character and reduced baking time to 5 minutes. The "flash baker", now in almost universal use, is a topless box parallel to the acid tubs, and its charging and emptying are now incidents in the cleaning cycle rather than a separate operation.

A further word is in order regarding the lime. Years of patient research among possible substitutes for lime, whose insolubility and irregular chemical character have been weaknesses, has begun to pay off. A dozen proprietary mixtures are in use, based on borax, soda ash, phosphates, and others. Some mills have switched entirely and with complete satisfaction to one of these substitutes. They may ultimately drive out lime. Baking of such coats seems not to be obligatory, though many regard it as highly desirable.

Cleaning house equipment has undergone changes during this revolution. Standard practice now calls for the various baths to stand in a straight line, served by a bridge or preferably a gantry crane, motor driven, with the operator practically at floor level. The vats, once of wood, are now constructed of a permanent character, usually one of two types;

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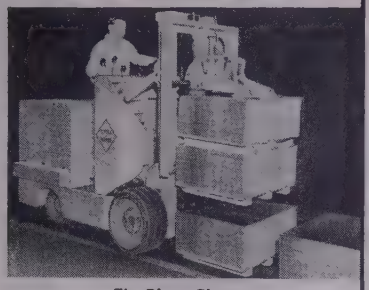

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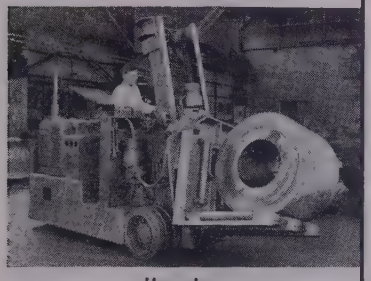

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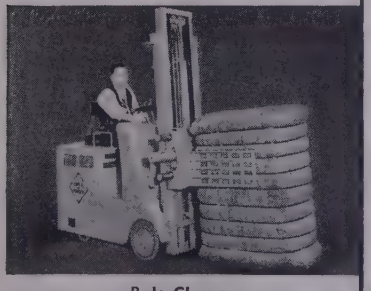

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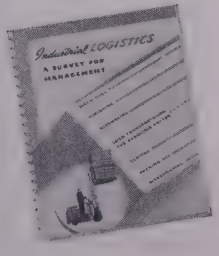

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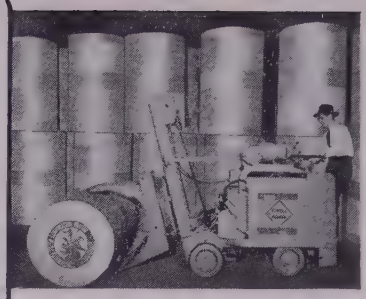

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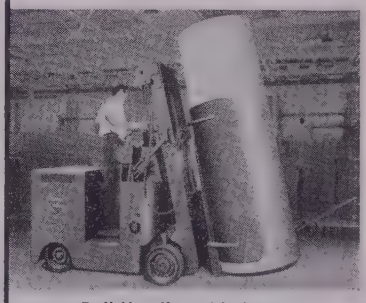
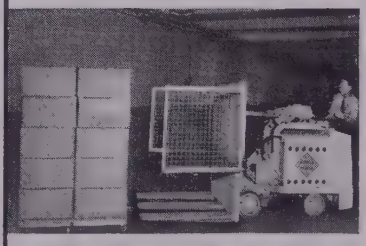
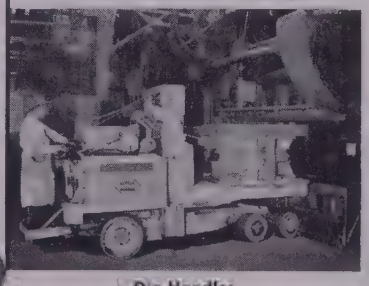


Roll Handler with Apron



Fork Truck with Side Wings



Die Handler

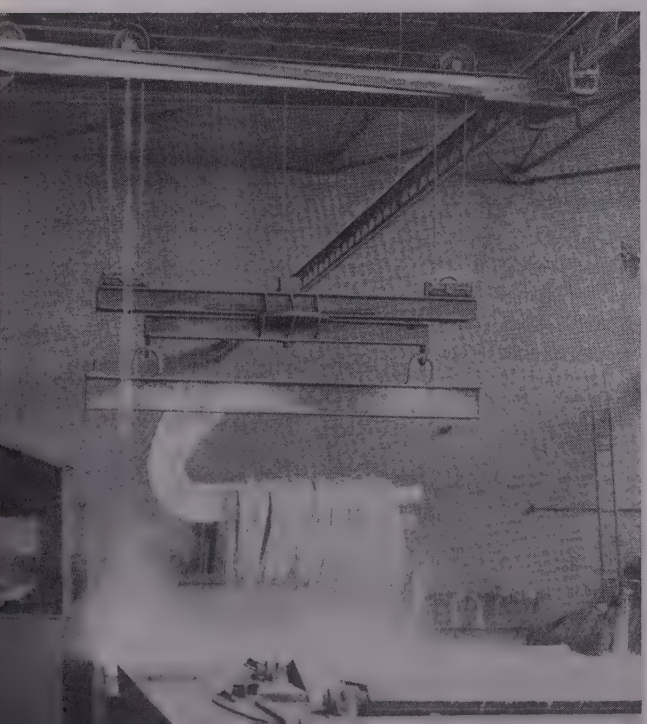
either steel, lined with about ⅜-inch of semi-soft rubber bonded to it and protected from mechanical injury by a brick lining, or a concrete shell lined with brick laid up in acid-proof cement. As to the arrangement of the units and the general nature of the load carrier, the accompanying photographs will be better than a thousand words. Cleaning of rods now costs something of the order of eleven man-minutes per ton.

Having started to follow the wire through the operations in their proper order, we now arrive at the die, and it is here, if ever, that the nature of wire drawing should be set forth. The flowing of red-hot steel under pressure, under blows of the hammer, and other stresses, is familiar to all and excites no wonder; the stuff is palpably soft, so it yields. But cold steel is proverbially a rigid material, and few laymen can grasp the mechanism by which it is induced to flow.

Iron is a crystalline material. As it cools from the molten state a number of buds, or nuclei, simultaneously take form as single cubic crystals, to each of which other crystals, newly formed, promptly adhere, all crystals in each group similarly oriented. When these islands have grown until they are about to touch, a situation arises in which the space between them is too narrow for the smallest conceivable crystal to form, so the material in these spaces freezes as "amorphous" metal. Each of these islands of crystals is a "grain" and the amorphous material outlines the grain boundaries. When the wire is crowded into the cone of the die and the pinch is applied to it, the crystals yield without fracture. Each one is made up of smaller crystals in regular layers, and along these layers as planes the crystals will divide and slip, so that each crystal changes shape without loss of bulk just as a pack of cards can be made, by pushing, to take up a rhomboid section by the slipping of card on card.

In the first draft all yielding takes place in the

Fig. 6—Rod bundles cleaned and limed; flash baker in foreground. Cleveland Crane & Engineering photo



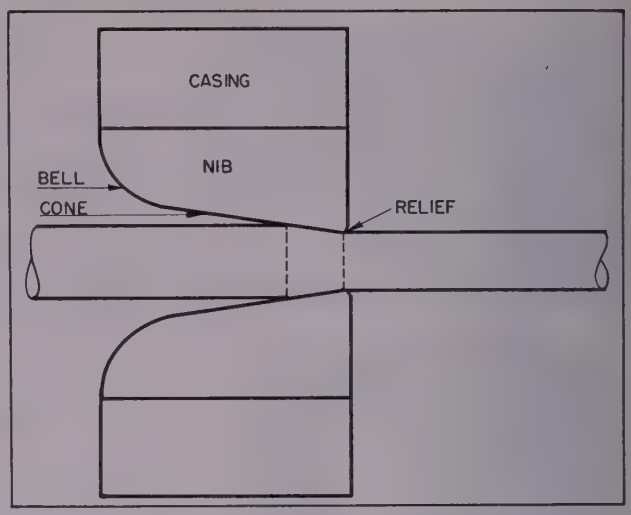


Fig. 7—Sketch showing cross-section through die and wire in 16 degree angle

grains whose crystals are most favorably oriented with respect to the direction of the stress. The wire elongates. On a subsequent draft there is no further movement in these grains; the burden falls on grains less favorably but still reasonably well oriented and in their original condition. The reason that grains once worked resist further distortion is that there is formed on the slip planes an amorphous paste made of broken down crystalline material. This paste resembles carpenter's glue in its properties; while slippage is in progress it facilitates the movement, but the instant movement stops this paste "sets" and becomes more rigid than the crystalline material. A grain in which slip has taken place is rigid and resists further flow. When all the grains have taken their turn the whole mass is too stiff for further drawing and must be annealed, upon which the amorphous material goes back into crystals. Cold-worked steel is hard simply by virtue of the presence of large amounts of amorphous film; the unworked crystals have been proved to retain their original softness. The amorphous material is also bulkier than its crystalline equivalent; hard-drawn wire loses a bit of its specific gravity in the die.

Wire can be drawn, therefore, because its crystals are capable, through movement on their slip planes, of changing shape without rupture.

A question which naturally arises in the lay mind is this: Obviously the unit stress acting on the steel in the die must exceed the yield point of the steel; why, therefore, does not the leading strand between the die and the wire block break? Wire-drawing is an application of the principle of the wedge, one of those mechanical devices by which, as with the lever, the screw, or the pulley, we can outwit nature by swapping distance for force. A glance at the diagram of wire in the die will show that in order to effect the small difference between the diameters of the starting and finished wires we are moving the wire through the die about four times this distance. Reduction is accomplished by radial compressive forces which are induced by the tensile

pull but in which the tensile pull, as such, plays no part whatever. Wire could be drawn as well by pushing it as by pulling it.

Material of the die has been, up to within 20 years, a hypereutectoid steel, straight carbon or carbon with chrome or tungsten or both, so treated as to consist of carbides of the base metals massed in a matrix of ferrite or of globular pearlite. In recent years carbides of some of the rare metals, chiefly tungsten, have been massed more densely in a matrix of cobalt and sintered to form an extremely hard and efficient die whose life, as compared to that of steel dies, is of the order of a thousand times longer. A conical opening ground and polished with diamond powder averages about 16 degrees included angle, varying somewhat with percentage reduction, being generally such that the total contact area is about four times the area of the entering section. The ideal die shape is a perfect truncated cone, which, for the sake of resistance to shear at the exit, may be intersected by a reverse cone of the smallest conceivable angle. In fact if an attempt is made to intersect the cone from the opposite side with a cylindrical passage, the resulting passage will be conical to the proper degree because of the impossibility of grinding a truly cylindrical hole. The intersecting edge is polished down a trifle. The carbide "nib" is secured by shrinkage or otherwise in a casing of steel or Monel, and the whole unit is customarily mounted in a fixture of such nature that water can be circulated around it to carry off heat generated in drawing.

(*To be continued*)

Low Cost Production

(*Concluded from Page* 52)

operation and more satisfactory cutting. Castings are mounted in special fixtures before high-speed grinders which remove all traces of gates and sprues. Final finish to the casting is a sand-blasting operation which removes all traces of adhering investment and imparts an attractive surface finish. Jigs, snap gages and micrometers are used in final inspection work. It is not unusual to hold tolerances of plus or minus 0.004-inch over a long production run on intricate shapes.

Wide Range of Parts — Types of parts which can be produced at a saving by precision casting cover a wide range. Among the hundreds which Michigan Steel Casting has undertaken are the following six unusual pieces:

1. Sewing machine feed dog, of type 420 stainless steel, weighing 0.6 ounce. Replacing a part formerly machined out of solid stock, the casting eliminates costly operations such as broaching, contour milling and hand grinding of irregular surfaces. Tolerances must be held within a few thousandths of an inch on most dimensions.

2. Automotive governor fly weight, of type 440 stainless steel modified, weighing 1 ounce. No measurable wear was found on this part after thousands of miles of service under the severe driving conditions of stop-and-go bus service. It replaced a die casting which was inclined to fail through excessive wear and breakage.

3. Aircraft carburetor metering valve of 18-8 stainless steel, weighing 7.6 ounces The part was produced to the most rigid aircraft material specifications and represented a saving of 84 per cent in scrap which would have resulted from machining the piece out of solid bar stock.

4. Bracket support and cap, of type 420 stainless steel, weighing 5.2 ounces. Both parts of this actuator assembly are precision cast to tolerances on the order of plus or minus 0.002-inch. Use of the process allowed freedom of design, elimination of forging die expense and appreciable reduction in machining costs over the forging method.

5. Rotor winding pickup finger, of type 440 stainless steel modified, weighing 0.24-ounce. This seemingly simple-looking part is actually intricate from a design and dimensional standpoint, and a changeover from toolroom manufacturing methods to precision casting brought a cost saving of 94 per cent. The piece is an essential part of the winding machines used for production of automotive generators and starter motors.

6. Core catcher finger, of type 410 stainless steel modified, weighing 0.6-ounce. Over 500,000 castings have been produced to exacting physical and metallurgical specifications. Exceptionally high service stresses, in oil well drilling equipment, require critical inspection, including 100 per cent x-ray.

Guide To Better Understanding

THAT users of spectrophotometers can better understand their instruments, calibrate and maintain them in proper operating condition and guard against numerous errors common in such work, the National Bureau of Standards is making available a new booklet of techniques and data resulting from its extensive experience. Instruments and methods for use in the ultraviolet, visible and near-infrared spectral regions are considered, including photographic, visual and photoelectric methods.

Some of the topics covered are: Definitions of spectrophotometric terms, essential parts of spectrophotometers, typical instruments in current use, types of errors which usually occur in spectrophotometric work and presentation of standard data for checking the calibration of these instruments. A bibliography of 127 related references is given in this circular, identified as No. 484, and available from U. S. Government Printing Office, Washington 25, D. C.

TYPICAL PRECISION CASTING STEELS

Type	C	Mn	Si	P	Analysis S	Cr	Ni	Mo	Co	Yield Point Psi.	Tens. Str. Psi.	Elong. in 1-in., %	Red. of Area %	Rockwell Hardness
Carbon steel	0.23	0.72	0.44	0.031	0.032	...	...	...	...	56,300	84,600	32	59	B82
Cr Mo steel	0.47	0.90	0.59	0.018	0.027	0.99	...	0.27	...	120,800	150,800	12	30	C29
Type 420 Stainless*	0.31	0.72	0.83	0.04	0.04	13.92	0.20	...	...	98,000	122,800	20	44	C20
Type 410 Stainless*	0.15	0.63	0.84	0.04	0.04	12.37	0.78	...	...	109,000	116,000	12	35.5	C24
Type 440 Stainless*	1.68	0.57	0.40	0.05	0.05	13.02	...	0.79	0.65	.....	141,000	..	..	C61
Type 302 Stainless*	0.19	0.69	0.39	0.04	0.04	18.32	9.32	...	...	44,800	76,000	51	39	B81

* Modified for precision castings; Miscrome alloys 1, 4, 5, 18-8.

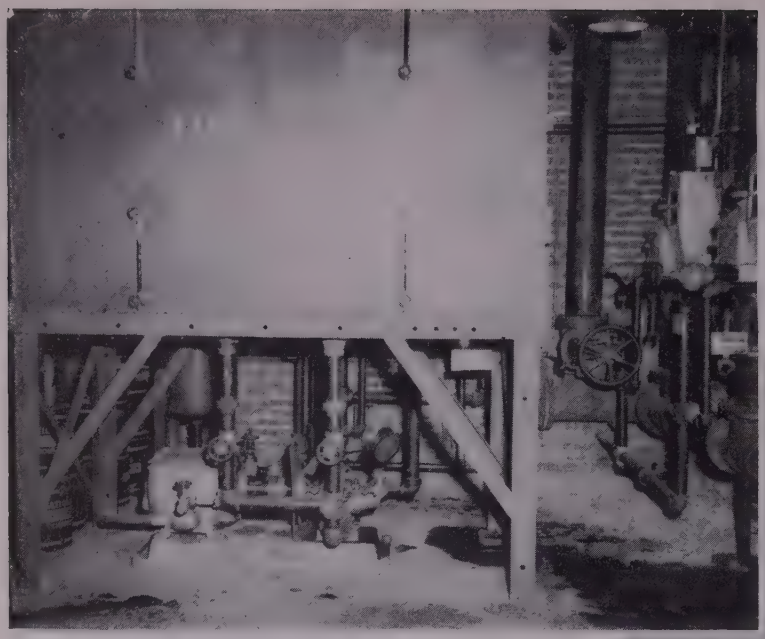


Fig. 1 (left)—Storage tank and injection pump of system which has capacity for extinguishing one fire and leaving an adequate reserve

Fig. 2 (below)—Mechanical foam system after 2 minutes of operation. After 3 3/10 minutes a blanket of 7 inches of foam covered the railroad spur, already almost invisible

VOLATILE LIQUID FIRES

Extinguished Rapidly by Foam Blanket

FIRE-SMOTHERING foam can be discharged at the rate of 2 inches of depth per minute by the fire protection system recently installed at Schenectady Varnish Co., Schenectady, N. Y. In 3 minutes it is capable of bringing under control any spill fire that might occur at tank car unloading locations and flammable liquid storage tanks on a 25 to 40-foot wide railroad spur located adjacent to the plant.

The system, adaptable for use in coke by-product plants, quenching, dipping and cleaning operations, oil cellars, etc., was installed by Automatic Sprinkler Corp. of America, Youngstown. Area protected is about 450 feet long and is divided into three system areas, protection for each being regulated by a 6-inch deluge valve, actuated pneumatically by pressure impulse from pneumatic heat detectors strategically located throughout the area.

Mechanical functions of the system are based upon the integration of two operational units: Sprinkler system equipped with 16 or 17 overhead foam aerating and discharge devices for a total foam discharge of about 8800 gallons per minute per system; foam storage and injection system (Fig. 1) consisting of a small foam injection pump which takes suction from a double compartmented 800-gallon foam liquid storage tank. One side of this tank is always open as suction to the pump, while the other is kept closed so that the system may be immediately returned to service following operation from fire.

Mixed With Water: When mixed with water and aerated, the Aer-O-Foam installation forms 58,000 gallons of the smothering mechanical foam from each compartment of the tank. The foam itself is generated from a hydrolyzed protein manufactured from a soya bean base and mixed 5 or 6 per cent with water.

In a test of the installation, the 6-inch deluge valve operated within 18 seconds after heat was applied to one of the heat-actuated devices. This started the foam liquid pump and opened the companion valve to start the injection of foam liquid into the system. Twenty seconds later the deflectors of the system were discharging foam at full efficiency as shown in Fig. 2 (after 2 minutes of operation).

In the 3 3/10 minutes the system was allowed to operate, about 190 gallons of foam liquid were used, leaving a blanket of 7 inches of foam on the spur track which is almost invisible in the photograph. Water, applied with no serious dissipation of the foam apparent, may be useful in reducing the volume of foam liquid required when properly applied. Removal of the foam blanket is no problem, as the foam dehydrates within a few hours and dissipates itself.

Bibliography Supplemented

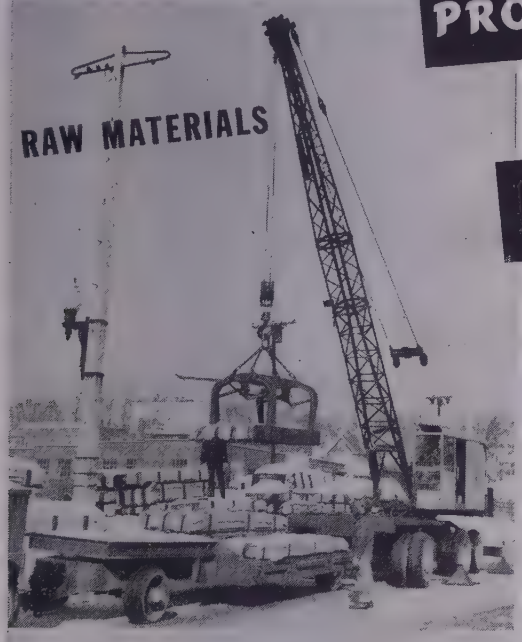
FIFTH supplement to the American Society for Testing Materials bibliography and abstracts on electrical contacts includes a number of replacements and new references for the period 1940 through 1946 and new material for 1947 and 1948. The fifth issued since 1944, the 24-page supplement is available from the society, 1916 Race St., Philadelphia, as is the original 148-page bibliography.

PROBLEM

HOW TO HANDLE MORE MATERIALS AT LESS COST . . .

ANSWER

USE A MULTI-PURPOSE LORAIN!



MATERIAL handling men—do this! Make a *complete list* of all types of materials that must be moved in your plant. Then find out from your Lorain Distributor how a Lorain Crane can save time and money on every application.

Five Lorains are shown here—each one equipped to handle a different type of material. And that's the reason a Lorain will keep busy every hour of the day—in any season. These portable Cranes can move anywhere in the yard . . . can be equipped with over 15 different attachments for handling any type of material—from raw material to the finished product.

Your Thew-Lorain Distributor has the answer to "more materials moved . . . at lower cost." Take your problem to him—today!

160 LORAIN COMBINATIONS

You can *select* the correct size and type Lorain to exactly fit your plant conditions and layout . . . from several lifting capacities, 5 interchangeable booms . . . and many types of crawler or rubber-tire mountings.

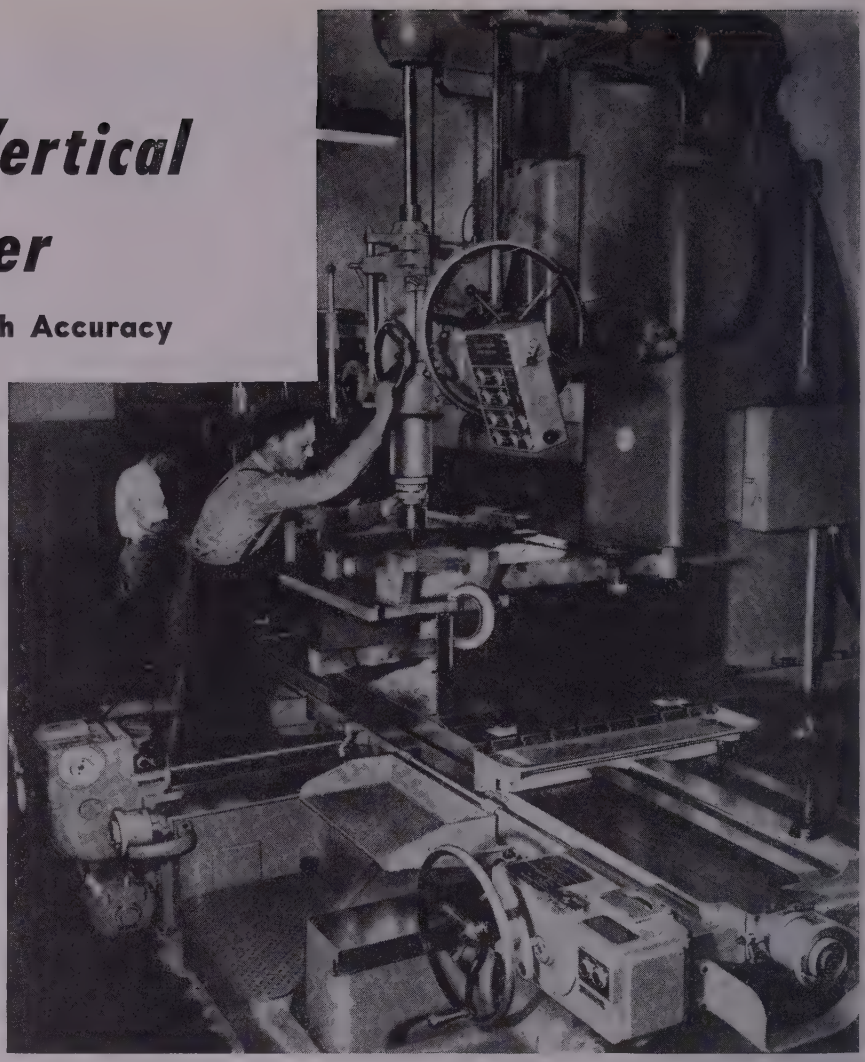
THE THEW SHOVEL CO.
LORAIN, OHIO

MORE FOR YOUR MONEY IN A LORAIN

THEW Lorain® CRANES FOR INDUSTRY

"Largest" Vertical Jig Borer

Machines to 0.0001-Inch Accuracy



WORK weighing up to 2½ tons may be located and bored to 0.0001-inch accuracy with a new vertical type jig borer of open-side construction. Said by its manufacturer, Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford 1, Conn., to be the largest vertical type jig borer ever built, it has a 36 x 72-inch table with longitudinal travel of 60 inches and transverse travel of 36 inches. Although the maximum standard height from table top to spindle nose is 33 inches, columns of 6, 10 and 14 inches higher than standard can be furnished, increasing vertical capacity to a maximum of 47 inches. Other pieces of optional equipment are a rectangular built-in 42-inch diameter rotary table, and a built-in 48-inch rotary table.

As the new 4-E machine is much larger than other jig borers made by the company, it is equipped with a new type Electrolimit measuring system in place of the standard end measure system. Electrical controls of the machine's primary functions are concentrated in a pendent control station located at the normal operating position, but adjustable to suit operating conditions. Pushbutton controls and selector switches include: Spindle motor speed selector; spindle start, stop and reverse; spindle clutch and brake; spindle head, vertical power movement with automatic clamping and unclamping; longitudinal rapid power travel of table for quick positioning; carriage and table power milling feed selector giving full range from 1 to 15 inches per minute.

Besides controls on the pendent box, pushbuttons are located on both carriage and table control brackets for controlling rapid power travel when positioning work in both longitudinal and transverse directions. Tools as large as No. 5 Morse taper are held in the spindle with collets and a spindle nose cap. The 5½-inch diameter hardened, ground and lapped quill has a 10-inch vertical travel with power feeds both up and down, ranging from 0.0005 to 0.015-inch per revolution of the spindle.

An electric control cabinet at the right of the machine contains a main disconnect switch, all starters, relays, electronic and other electrical apparatus for the operation of the machine. Floor space required for the entire machine and control cabinet is about 11 x 12½ feet.

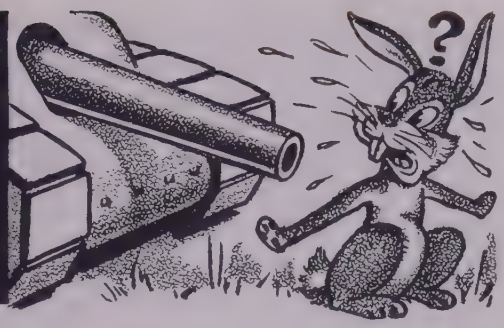
For Multiple Drilling Problems

PROBLEM of production drilling many holes is frequently solved by putting multiple spindle drilling heads on single spindle drill presses, only to find that this equipment is often taxed beyond their limit of capacity and that there are thrust, speed and power deficiencies encountered. To satisfy the needs of such an operation, Zagar Tool Inc. of Cleveland, has designed a jig driller, a drill jig converted into a drilling machine. It consists of a four-post pump type drill jig on which is mounted a standard gearless drill head with a hole pattern to suit the part being drilled.

In the middle of the jig is a bushing plate which holds the various drill bushings and the locators for the parts being drilled. Feeding is accomplished by the operating handle which feeds the parts into the drills through the standard rack and pinion mechanism as provided in the drill jig. An air or hydraulic cylinder can be used to supplement the feeding mechanism in some jobs where it is necessary.

The four-post construction of the drill jig is said to be extremely rigid. Leverage or feed capacity is limitless, depending upon the length of the handle. The drill head is driven through V-belts, correct drill speeds being obtained by the proper pulley ratios. The driller is set into a coolant tank, the pump of which is driven from the reverse side of the electric motor shaft.

Why HUNT RABBITS with a TANK?



on Most Jobs a KRW 100-TON PRESS WILL EQUAL HEAVIER, COSTLIER, EQUIPMENT and SAVE YOU MONEY!

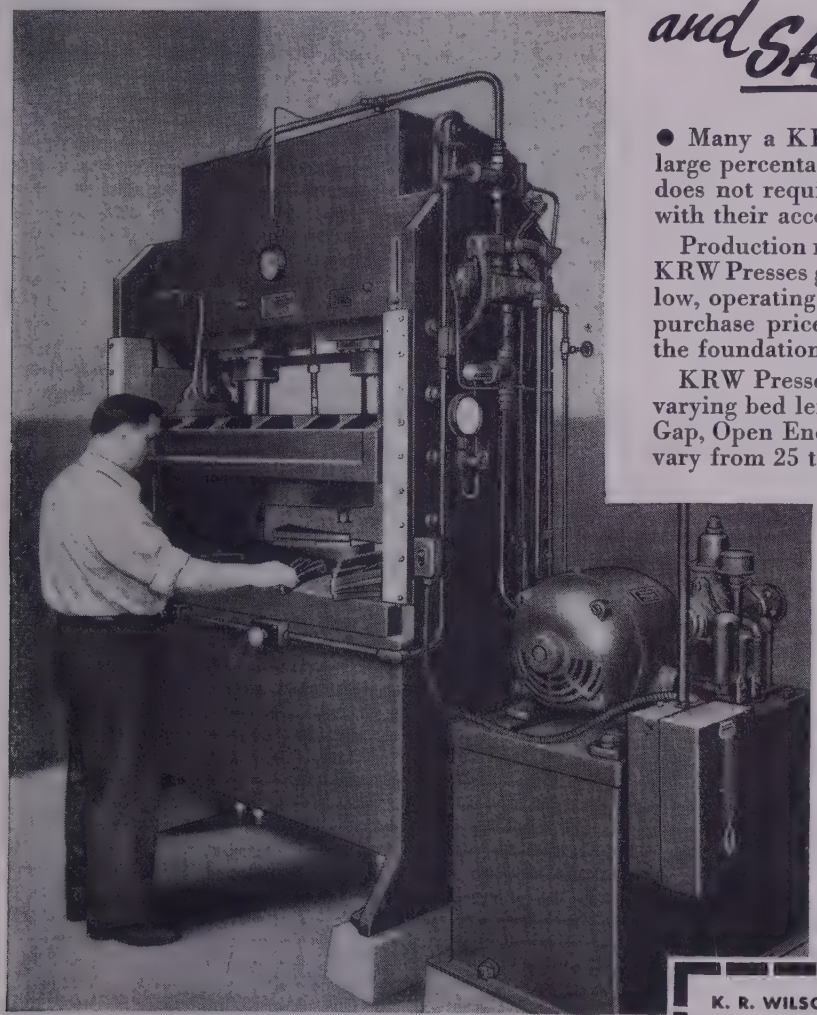


Illustration shows a KRW 100-Ton Hydraulic Press in plant of Elrae Pressed Metals, Inc., Buffalo, N. Y. When the picture was taken, bicycle parts were being formed.

● Many a KRW Press user discovered long ago that a large percentage of forming, drawing and stamping work does not require the use of large, heavy-tonnage presses with their accompanying high initial and operating cost.

Production records, in a variety of industries, show that KRW Presses greatly reduce costs. First investment is very low, operating costs are still lower. In one instance, the purchase price of a KRW Stamping Press was less than the foundation cost for heavier equipment.

KRW Presses are highly flexible...they can be built in varying bed lengths. KRW Presses are available as either Gap, Open End or Closed End Types. Tonnage pressures vary from 25 to 100 tons. Because they are hydraulically operated and not mechanically driven, they are quiet and vibrationless in operation. Platens can be stopped and reversed at any point in their travel.

Let us know your needs...we are fully equipped to engineer our equipment to handle your work. In the majority of cases, we can make delivery in a fraction of the time required for other type presses. Let us hear from you.

ALL TYPES OF DIES. We are equipped to engineer and build dies to meet your specifications. All we need is available technical data, blueprints and, where practical, a sample piece of work. We'll quote prices and delivery date.

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K. R. WILSON, 215 Main St., Buffalo 3, N. Y.

Please send me complete information on new KRW 100-ton Hydraulic Presses.

Name _____

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82

Electric Furnaces

Now Challenge the Open Hearth

Thermal efficiency of large modern American electric arc furnaces reaches 80 per cent. Electric steel being made on 1½ million Btu. New inductive stirring device operates on inductive motor principle

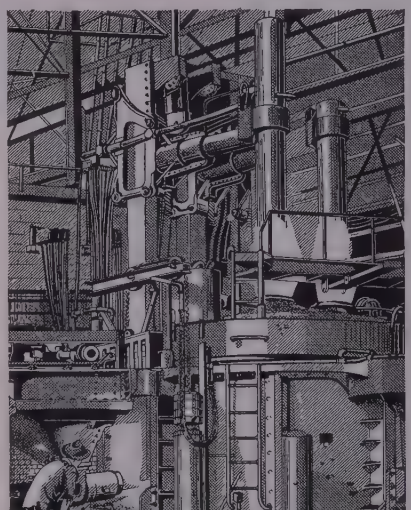
ELECTRIC furnaces now are a challenge to the open hearth. This trend in the steelmaking industry was announced by F. W. Brooke, vice president, Swindell-Dressler Corp., Pittsburgh, at the seventh annual Electric Furnace Steel Conference of the Iron and Steel Division, American Institute of Mining and Metallurgical Engineers, Hotel William Penn, Pittsburgh, December 8-10.

Tons per hour is remarkable for the size of the installations now in service. For example, he stated, a 240-ton open hearth, 87 feet long, will produce 20 to 21 tons of steel an hour whereas an electric furnace, 17 feet diameter, will make 15 tons an hour.

Large electric furnaces in operation at various steelmaking shops have a thermal efficiency of 80 per cent. This, Mr. Brooke pointed out, was not thought of 10 years ago. He emphasized that steel is being made in the large high-efficiency electric furnaces on 1,600,000 Btu per ton which compares with the best open-hearth practice of 3½ million Btu per ton where the charge is 60 per cent scrap and 40 per cent hot metal.

New Officers—The following officers were elected for the year 1950: J. A. Bowers, chairman of executive committee of the Electric Furnace Steel Committee, and melting superintendent, American Cast Iron Pipe Co., Birmingham, Ala.; T. J. McLoughlin, conference chairman and assistant to vice president in charge of operations, Carnegie-Illinois Steel Corp., Pittsburgh; and R. H. Frank, vice chairman, Conference Committee and chief metallurgist, Bonney-Floyd Co., Columbus, O. Next year's meeting will be held at the William Penn Hotel, December 7-9.

W. G. Nichol, manager, Methods Engineering Bureau, Carnegie-Illinois Steel Corp., Pittsburgh, in speaking on "Materials Handling in the Electric Furnace Shop" pointed out that handling costs comprise as much as 30 per cent of production costs, and that 50 per cent of this cost is in material handling. He emphasized that efficient handling increases the production of the worker, reduces



labor costs, increases the utilization of equipment, lowers the accident rate, and should improve labor relations. Palletizing of refractories, the speaker related, now has replaced old-time methods at a saving of $10 per car on the initial unloading operation. By bundling electrolytic nickel it is possible to unload a car in 19 minutes compared with 50 to 70 man-hours when not bundled.

Flexible Handling—The cost of rearranging palletized refractories shipped in railroad cars is about the same as palletizing the material at the plant, according to F. C. Weir, superintendent of material handling, Steel and Tube Division, Timken Roller Bearing Co., Canton, O. Ferro products are handled at his plant in boxes. The speaker explained that this system provides flexibility in storage and movement, conserves space, and the boxes can be diverted to the handling of other materials in the plant. Materials are identified by means of a card attached to each box. Approximately 3000 pounds of ferromanganese fills three-fourths of the box whereas a fully loaded box of ferrosilicon amounts to 2000 pounds.

Electrolytic nickel is handled at the Timken plant in 4000 pound loads by means of fork lift trucks which operate in box cars. The speaker pointed out that there is no difficulty from fumes in operating gasoline-operated lift trucks in box cars.

Electrodes are received in unit loads composed of three electrodes each. These loads pile uniformly up to 10 feet high and are handled by means of lift trucks. Timken also employs lift trucks for the movement of electric furnace doors and frames from the melt shop to the weld shop, a distance of ½ mile.

J. J. Wyandt, assistant superintendent of Nos. 2 and 3 melt shops, Central Alloy District, Canton Steel Works, Republic Steel Corp., Canton, O., in discussing the handling of electrodes, pointed out that it formerly required 8 hours to unload a car of electrodes whereas today, when palletized, the unloading time amounts to 1½ hours. He recommended that electric furnace steelmakers keep in close contact with electrode manufacturers regarding their requirements inasmuch as a complete cycle of producing an electrode is approximately three months. One steelmaker in stressing the importance of storing electrodes under cover drew attention to the fact that out-of-door storage leads to damaged threads and chipped end faces.

A paper entitled "Inductive Stirring in Arc Furnaces" by S. Fornander, research manager, Surahammars Bruks AB, Surahammar, Sweden, and F. Nilsson, general manager, Hagfors Steelworks, Uddeholms AB, Uddeholm, Sweden, aroused considerable interest and discussion. The principle of the stirrer is this: The stirrer, which operates on an induction motor principle, is placed under the nonmagnetic bottom plate of the furnace and works on two

the **M-R-C** "*Synthe-Seal*" bearing

Pat. No. 2,467,049

A standard-dimension ball bearing with a removable synthetic rubber seal for keeping out dirt, grit and moisture and for keeping in lubricant.

MARLIN-ROCKWELL CORPORATION, Jamestown, N. Y.

phases. Electric currents in the two phases induce electric current paths in the liquid steel bath. At the same time the two phases generate a moving magnetic field, which reacts upon the steel composing the current paths with forces parallel to the furnace bottom. Result is that those parts of the bath which are close to the furnace bottom are set in motion in the direction parallel to the bottom.

Oxygen Content Lower—Inductive stirring has no influence upon carbon refining at high or medium carbon contents. In the production of low-carbon steels, the stirring makes it possible to attain lower carbon contents. In spite of this, the authors pointed out, the oxygen content of the steel is lower and the FeO content of the slag lower than in conventional practice. The slagging-off operation is considerably facilitated by the stirring and can be carried out more effectively than in normal practice. Phosphorus and chromium can be removed effectively.

Reactions occurring between steel and slag during the reducing period are accelerated and extremely low oxygen contents can be attained. Reducing time can be shortened. Differences in temperature and concentration in the bath during the refining period are equalized by the inductive stirring. Heat transfer from the arcs to the steel bath is facilitated

In discussing the subject "Application of Temperature Measurements" G. E. Wagner, melter foreman, Electric Furnace Department, Carnegie-Illinois Steel Corp., Duquesne, Pa. mentioned that the sculling of hot heats has been reduced about 60 per cent by the use of the immersion type thermocouple. He stated that the total cost of maintaining an immersion type couple in service is approximately 1.65 cents per reading or 6.6 cents per net ton of steel.

Discussing the effect of large transformers on the rate of production, one steelmaker asserted that the larger transformer shortens the melting period. He stated that the time from tap to the first preliminary analysis was shortened 16 per cent by the use of larger transformers without any ill effect on the roof or sidewalls.

W. M. Patterson, Electric Furnace Department, Allegheny Ludlum Steel Corp., Brackenridge, Pa. mentioned that in his shop an 18-foot electric furnace averaging 80 tons per heat is equipped with a 16,000-kva transformer and that it is possible to make from 12 to 20 tons of rimming steel per hour. One of the problems with which the shop is faced is the loss of roof brick in the electrode ring where the circle is knocked out in from 70 to 100 heats.

Reladling Advantages — In presenting details on obtaining uniform bath composition by reladling, J. J. Green, Universal-Cyclops Steel Corp., Bridgeville, Pa. described how a portion of metal was tapped out of the furnace and then poured back into the furnace over the lip of the ladle, thus duplicating to some extent the type of mechanical mixing that occurs during the tapping of a heat. He told members that the mechanical mixing of the bath by this method has resulted in the complete elimination of discrepant results due to an insufficiently mixed bath. Because of reladling, he stated, we have been able to control bath composition of all elements more closely. One advantage of the reladling process, he explained, is that it cools the bath considerably. Since the reladling operation has been in regular use, the analyses have been much closer controlled and the shop has been able to melt to relatively narrow aims within any given specification.

The immersion rayotube, an instrument for temperature control in melting high-grade basic electric steels, was described in detail in a paper "Temperature Measurement in Basic Arc Furnace" by C. B. Post, metallurgist and D. G. Schoffstall, melt shop metallurgist, Carpenter Steel Co., Reading, Pa. Mr. Post mentioned that the instrument enables any number of readings to be taken during the course of a heat by the melter with reproducible results. He stated that the cost per reading when using the modified blowpipe in the arc furnace with nitrogen approximates 60 cents though this cost can be lowered by substituting air for nitrogen. A graphite insert on the end of the blowpipe enables the instrument to be used for consecutive readings in the furnace bath without any unusual labor and maintenance.

An Electronic Voice Warns

SAFETY messages can be delivered verbally at the danger point and before the danger moment by a recently introduced electronic device. Called the Saf-T-Vox, it is a small compact unit for the recording and reproducing of safety messages, developed by General Electric Co. and adapted to the field of industrial safety by American Allsafe Co., Buffalo.

A simple mechanism for handling a magnetic tape on which messages are recorded, an amplifier, a loudspeaker and a starting trigger are employed in the unit, which requires no resetting or rewinding.

LETTERS
to the Editors

Can't Disclose Name

Your squib about the automobile manufacturer who saved a dollar a car by redesigning an ignition switch caught us all aback. What does his switch cost him now? We await your reply with bated breath—and please don't keep us bating too long. We may be in the wrong business.

Ed Heller, President
Watts Electric & Mfg. Co.
Birmingham, Mich.

We have checked with the automobile company in question and are informed that the details of this saving are correct, but that company policy will not permit disclosing the name of the ignition switch supplier or the actual cost of the switch after redesigning. —The Editors

Cast Iron Scrap Grades

We would kindly ask at this time that you please advise what exactly constitutes the various cast iron grades of scrap. The question has arisen several times in the past as to what actually is meant as to size, etc., of No. 1 cupola cast.

A. R. Bernard
Maddox Foundry & Machine Works
Archer, Fla.

Office of Price Administration specifications are still widely accepted by the trade. These specifications for cast iron grades are: NO. 1 CUPOLA CAST: Clean cast iron scrap, such as columns, pipes, plates, castings of miscellaneous nature, including cast iron parts of agricultural machinery. Must be free from stove plate, burnt iron, brake shoes, foreign material. Must be cupola size, not over 24 x 30 inches, no piece over 150 pounds.

CHARGING BOX CAST: Clean cast iron scrap not over 5 feet long or 18 inches wide, suitable for open-hearth furnace charging without further preparation. Must be free from burnt iron, brake shoes, stove plate. HEAVY BREAKABLE CAST: Cast iron scrap over charging box size or weighing over 500 pounds and which can be broken by ordinary drop into cupola size. May include cylinders, driving wheel centers, but not hammer blocks or bases. May include steel as integral part of casting which does not protrude over 6 inches and which does not exceed 10 per cent of casting weight.

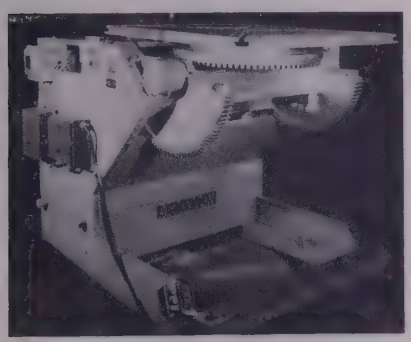
BURNT CAST: Burnt cast iron scrap such as stove parts, grate bars, miscellaneous burnt iron. Includes sash and window weights. CAST IRON BRAKE SHOES: Driving and/or car brake shoes of all types, except composition-filled shoes. STOVE PLATES: Clean cast iron stove plate. Must be free from malleable and steel parts, window weights, plow points, burnt cast. CLEAN AUTO CAST: Clean auto blocks, free of all steel parts except camshafts, valves, valve springs, studs. UNSTRIPPED MOTOR BLOCKS: Automobile or truck motors from which steel and nonferrous fittings have not been removed. Must be free of drive shafts, differentials, parts of frames.

NO. 1 WHEELS: Cast iron railroad car or locomotive wheels. MALLEABLE: Parts of automobiles, railroad cars, locomotives or miscellaneous malleable iron casting. Must be free of cast iron and steel parts, other foreign material.—The Editors

New Products and Equipment

Positioners for Assembling

Speeds infinitely variable from 0 to 0.75 rpm are offered on all models in the line of heavy duty gear driven welding and assembling positioners, built by Aronson Machine Co., Arcade, N. Y. With capacities of 2500, 3000, 4000, 5000 and 6000 pounds, the positioners have a work table



which tilts 135 degrees in 40 seconds through a gear motor.

Features common to all machines are frame and sheet enclosures for the motors, variable speed drive and reducer units. Controls are located on one side of the machine for ease in operation. A 12-foot remote push-button is standard equipment. The elevating sub-base adjusts up to 24 inches.

Check No. 1 on Reply Card for more Details

Light-Weight Belt Conveyor

Storing vertically in less than 3 square feet is the Air-O-Mite light weight conveyor, offered by Arrow Products Inc., 417 Front Ave. N.W., Grand Rapids, Mich. It is easily movable up or down stairs, through doorways or over bumpy floors or soft ground by one man. It may be coupled in multiple units or coupled with the Air-O-Lite gravity conveyor.

Unit is Timken bearing-equipped and has a fully enclosed drive unit and complete forward and reverse operation. It is available in 8 or 10-foot models and with a portable aluminum base. It is moved on its own wheels in a manner similar to hand truck.

Check No. 2 on Reply Card for more Details

Truck Grading Fork Attachment

Handling of bulk materials too large to pass through a 2½-inch screen is possible with a gravity-dump grading fork attachment for industrial trucks, introduced by Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. Attachment is applicable to all models of Clark fork lift trucks of 2000 pound capacity and over. It is readily interchangeable with standard forks.

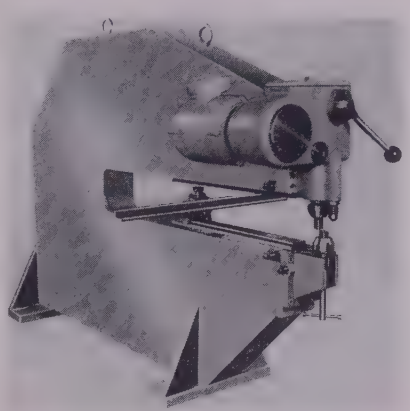
Fork has ¾-inch diameter removable tines spaced on 1 inch centers, making it possible to change the tine-spacing for handling of various sized materials. In operation the grading fork has the same characteristics as a gravity dump shovel. When the load is raised the fork locks in position and is dumped when released by a 15 pound pull.

Check No. 3 on Reply Card for more Details

Machine Cuts Sheet

Capable of cutting straight, circular and irregular shapes, in addition to folding, beading and slotting, is the model P-5 sheet steel and plate cutting machine, offered by American Pullmax Co. Inc., 2627 N. Western Ave., Chicago 47, Ill.

Mechanism is entirely enclosed and



operates in an oil bath. Circle cutting and straight cutting attachments have quick locking devices which permit size changes in one movement for faster operation and production work. Machine has an edge cutting capacity from finest gages up to $\frac{5}{32}$-inch in mild steel. It cuts circles from $3\frac{5}{32}$ up to 40 inches in diameter, and has a throat depth of 42 inches.

Check No. 4 on Reply Card for more Details

Tool Tests Machinability

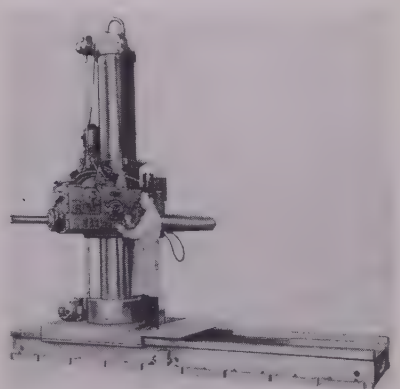
Machinability of ferrous and nonferrous metals may be tested by a simple workshop tool introduced by Vanton Equipment Corp., Empire State Bldg., New York 1, N. Y. Called the M.S.E. Schlesinger machinability tester, it offers a machinability index capable of development into a universal standard, this being done by a simple workshop test accomplished by one of the usual cutting operations such as turning or planing.

Tester investigates two basic characteristics of metals: Specific cutting resistance exerted by material against the penetration of a standardized kind and shape of cutting tool; abrasiveness effect of the same work material on a hardened calibrator. Machinability index is defined as machining effort, determined by multiplying the measured specific cutting resistance by the measured abrasion factor. These factors may be reproducible anywhere under the same general conditions. Testing unit is offered with all accessories necessary to conduct the test.

Check No. 5 on Reply Card for more Details

Heavy Duty Driller, Tapper

Ample power for handling a wide range of sizes on production of job shop work is provided by the 10 to 20 hp available on the model 1040 heavy duty horizontal drilling and tapping machine, offered by Kaukauna Machine Corp., Kaukauna, Wis. Head swivels 45 degrees up and down from horizontal and the column swivels 360 degrees to increase flexibility and to eliminate need for pit construction, trunnions and special holding fix-



tures. It can be used as a stationary fixed-location machine or as a portable unit with spreader arms, leveling jacks and lifting bail.

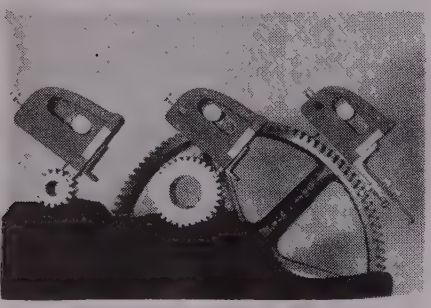
Designed for boring, drilling, tapping, reaming and spotfacing operations, it is equipped with a 4-inch diameter nitrided spindle with 36 inches of manual and power feed and with a No. 5 or 6 Morse taper hole in the spindle. A choice of three speed ranges from 25 to 300 rpm and four feed ranges giving spindle feeds from 0.0035 to 0.125-inch per revolution is given. Entire rail and head

assembly has 48 inches of vertical power traverse on the column with inching controls for final tool positioning. Column and head unit is mounted on a heavy runway with 48 inches of horizontal travel. Inching controls and rapid power traverse are standard equipment.

Check No. 6 on Reply Card for more Details

One Setup Gear Measuring

All measurements and characteristics in a gear are shown in one setup in a single operation with the Gearmaster micrometer and special spur gear charts designed by Urbauer Engineering Co., Naperville, Ill. Body of the instrument and extension bars for large gears are made from Invar-nickel alloy-steel that will not expand in any operating temperature to which the instrument may be subjected. The micrometer may be read in 0.0001-inch.



Gears may be checked while hot from operating tests and the measurements compared with those of gears which are cold. Exact measurements are registered at any temperature. System of measurement is applicable to spur, helical, herringbone and internal gears and to silent and roller chain sprockets. It is said that any mechanic who can read a micrometer can determine chordal measurement, tooth spacing, tooth form, tooth pressure angle, tooth thickness, backlash allowance, etc.

Check No. 7 on Reply Card for more Details

Platform Truck in Eight Sizes

Available in four series and eight standard sizes is a line of lightweight all-steel platform trucks, announced by Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich. The Roustabout trucks feature a method of construction which gives desired lightness for easy handling. Entire deck is die formed from one piece of steel, then arc-welded to make a smooth rigid platform.

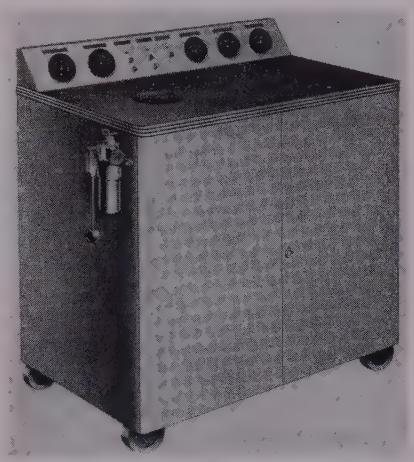
Inset welded handle pockets and rounded corners leave no projections. Deck sizes range from 24 x 48 to 36 x 72 inches, with capacity up to 3 tons for level bed or 2½ tons for tilt types. Both styles are available with molded-on rubber, Durastan plastic, or Nicro-Steel wheels in a variety of sizes. Trucks can be furnished with push handles at both ends or 36-inch pipe stakes, if desired.

Check No. 8 on Reply Card for more Details

Ultrasonic Equipment

Brush Development Co., 3405 Perkins Ave., Cleveland 14, O., is producing ultrasonic equipment for applying this force to commercial manufacturing on a production scale. The Hypersonic equipment is available in three models, first and smallest, model BU-101, for laboratory-scale research. Model BU-102, a more powerful pilot-plant unit, can be used for production operation. The third type is the full-scale production unit, custom built to the specific requirements of the user.

Equipment will make it possible to test in the laboratory the feasibility



of ultrasonic energy as applied to individual production problems, to test its application on a production scale and utilize the full benefit of ultrasonic techniques. Each model is supplied as a package unit. Typical applications are the complete emulsification of nonmiscible liquids, such as oil and water and the rearrangement of the molecular structure within a great variety of substances.

Check No. 9 on Reply Card for more Details

Counting Photoelectronically

Completely sealed and providing the necessary pulse output are two high-speed photoelectronic count detectors for use with standard electronic counters, made by Potter Instrument Co., 136 Roosevelt Ave., Flushing, N. Y. Variable predetermined electronic counters as well as totalizing counters are available for use with the detectors. Model 607 is contained in two identical housings, one of which is used for the light source and the other for the photocell and amplifier. Interchangeable lenses make two types of photoelectric beams available.

Model 608 is an integral unit containing both light source and amplifier. A fine focused spot $\frac{1}{16}$-inch in diameter is obtained midway between light source and detector. It will respond to light changes as small as 20 per cent. Parts as small as 0.001-inch may be counted.

Check No. 10 on Reply Card for more Details

Breaker for 1-42 Circuits

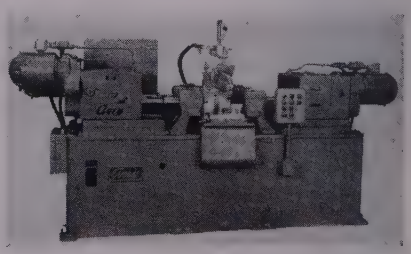
Featuring the thermal magnetic Multi-breaker design, a line of circuit breakers developed by Square D Co., 6060 Rivard St., Detroit 11, Mich., will handle from 1 to 42 lighting and appliance circuits. Line includes the single circuits MO-1, through the MO-2, MO-4, MO-8, MO-12, MO-20 and NMO panelboard.

The MO-8 starts with a minimum of four circuits on a basic device and four more single fold circuits can be added. Flexible plug-in Multi-breaker units may be installed on round bus bars, in two circuit steps, as additional circuits are needed on the MO-12, MO-20 and NMO panelboards.

Check No. 11 on Reply Card for more Details

Boring Machine Rough Finishes

Smooth cutting on a special boring machine built by Avey Drilling Machine Co., Cincinnati 1, O., is assured by large roller bearing housings at



each station which support cutter adaptors throughout the entire cut of the work piece. Both ends of work pieces are roughed and finished by the machine which has a two-position automatic hydraulic indexing table mounted on the machine base. Table is constructed to prevent entry of chips or any other foreign matter into vital working surfaces.

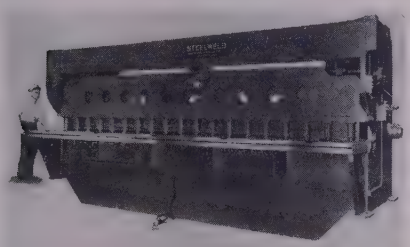
Cutting tool power source is provided by four cam feed units with specially arranged cycle to keep idle

time to a minimum. After work has been hydraulically clamped, the right and left hand roughing cutters advance at rapid traverse rate to a cutting position and then proceed to depth at a predetermined rate of feed. Table then moves to finishing position, then to original position for removal of work piece.

Check No. 12 on Reply Card for more Details

50 Strokes Per Minute Shear

Operating on the pivoted-blade principle, a Steelweld shear built by Cleveland Crane & Engineering Co., Wickliffe, O., has a shearing capacity of 18 feet of 3/16-inch mild steel at 50 strokes per minute. Blade travels in a circular path. Ball bearing



transfers in the bed facilitate movement of steel through the knives.

A motor-operated back gage with slow and fast control buttons eases positioning of material to be cut. Back gage indicator is seen through a slot in the hold-down beam. Shearing action is controlled by an electrically operated foot switch which may be moved about the floor. Frame and blade are of all-welded steel one-piece construction with the heavy bed extending below the floor. Knife clearance is adjusted by a hand crank and is shown on a large dial indicator.

Check No. 13 on Reply Card for more Details

Self-Contained Punching Unit

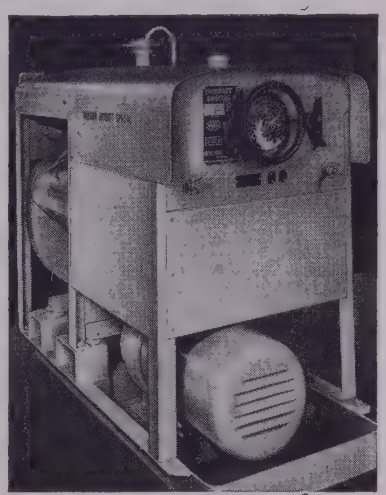
Wales-Strippit Corp., North Tonawanda, N. Y., is announcing a new Wales system of perforating and notching sheet metal for fast and efficient fabrication. Self-contained units are employed with a master template, placed on the press bed, having pilot pin holes located over the entire surface area in the same pattern as the perforations in the finished piece of work.

Setup templets, marked with operation number and punch size, are placed on top of the master template to identify the pilot pin holes to be used in each operation. Number of operations on each part depends on quantity, size and position of perforations. Use and reuse of the same group of units on unlimited setups on the master template is possible. An engineering change requiring a new hole location is merely a matter of drilling a new pilot pin position on the master template.

Check No. 14 on Reply Card for more Details

Welder Has Wide Range

A 36A generator with a welding range from 40 amp at 20 v to 250 amp at 40 v, is combined with a 31 hp air-cooled Wisconsin engine in the Wilson Hornet special arc welder, built by Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Control wheel mounted on the panel shows accurate current markings, readily obtained by setting the pointer located in the center of the wheel. Hand wheel has five positions with ample overlap to insure fine settings



from minimum to maximum output of the machine.

An auxiliary brush excites the main field of the generator. This insures instant recovery voltage over short circuit. Welding terminals are readily accessible with ample space between them to prevent accidental shorting. Engine has magneto ignition with impulse starting and is hand cranked. A two-wheel trailer type running gear is available.

Check No. 15 on Reply Card for more Details

Heavy Duty Dust Collectors

Portable in that they can be set up anywhere to serve one or several machines for any period of time are heavy duty dust collectors made by Kirk & Blum Mfg. Co., 2838 Spring Grove, Cincinnati 25, O. The type M unit is available in 450, 900 and 1800 cfm capacities at high velocity. They will handle dust from grinding, buffing and polishing metalworking machines and similar dust sources.

Each unit consists of motor, exhauster, centrifugal precleaner and steel wool filter after-cleaner. Housings of the fireproof unit are extra heavy and exhausters are direct connected to a 3600 rpm, 220/440 v motor. Dust receptacles are gasketed sliding drawers. Collector may be equipped with both exhaust stack and filters for optional indoor or outdoor diversion of exhaust.

Check No. 16 on Reply Card for more Details

Cradle Speeds Sheet Handling

Suitable for use in handling all sizes of commercial aluminum or stainless steel sheets in 36, 42, 48 and 54 inch widths and in 4 to 8 foot lengths is an adjustable cradle announced by Woodhouse Chain Works, Trenton, N. J. As the cradle

operates, its heat-treated alloy hooks pick up the boxes or skids of sheets, giving a vertical lift to the load at all points. Bowing of the sheet bundle is prevented, eliminating material kinking and safeguarding against gouging. The cradle sling has a safe working capacity of 2000 pounds.

Check No. 17 on Reply Card for more Details

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HANDLES CORROSIVES: Virgin rubber compound gives the new molded pail made by Stokes Molded Products Inc., Trenton 4, N. J., greater resistance to corrosive chemicals, abrasion and heat. It will not crack or chip. Pail is equipped with a bail-type handle of lead plated stainless steel with a hard rubber grip.

Check No. 18 on Reply Card for more Details

JOINS METALS, GLASS: A new thermosetting resin compound, adhesive A-1, announced by Armstrong Products Co., Burket, Ind., joins metals, glass, ceramics, plastics, wood and numerous other rigid materials to themselves or to each other.

Check No. 19 on Reply Card for more Details

TEMPERATURE INDICATORS: General Electric's Meter and Instrument Divisions, Schenectady 5, N. Y., announce a new line of temperature indicators that includes cold-end compensated thermocouple thermom-

eters for measuring temperatures up to 3000°F and resistance thermometers for temperatures up to 300° F. Thermocouple thermometer is available in two sizes: Type DO-71 with a 3½-inch flange and DW-71 with a 2½-inch flange. Resistance thermometers are available in two standard types: DB-15 long-scale instruments and types DD-6 and DD-7 6-inch rectangular, surface and flush-mounted instruments.

Check No. 20 on Reply Card for more Details

CHECKS HOLES: Blade contact type air spindles for column and dial type Precisionaires made by Sheffield Corp., Dayton 1, O., enable an instrument type check to be made of practically any hole regardless of finish, interruptions or size.

Check No. 21 on Reply Card for more Details

FOR RAPID READINGS: F. J. Stokes Machine Co., Philadelphia, Pa., announces a McLeod type high vacuum gage with a working range of 0.05 to 50 mm, calibrated in millimeters, lowest scale division is 0.01 (10 microns). It gives accurate readings in the twilight zone.

Check No. 22 on Reply Card for more Details

INDICATES CONDITION OF GASES: Excess smoke indicator type 2A1OC, made by Photoswitch Inc., Cambridge 42, Mass., gives a continuous indication to the boiler room of the condition of the gases which are passing through the flue, signalling when either smoke or air are sufficiently excessive to cause inefficient combustion or create a smoke nuisance.

Check No. 23 on Reply Card for more Details

STAND FOR SPOT WELDER: A new lightweight steel stand, made by Greyhound A. C. Arc Welder Corp., Brooklyn 6, N. Y., is designed for the company's portable and self-operating spot welder. The stand is 36 inches high, 15 inches long and 8½ inches wide.

Check No. 24 on Reply Card for more Details

UNOBSTRUCTED VISION: Jackson's type BX shield is specially designed for gas welding, cutting and brazing. Available from General Scientific Equipment Co., Philadelphia 32, Pa., it can be adjusted to fit properly and may be worn over prescription glasses.

Check No. 25 on Reply Card for more Details

COMPOSITION SEALED BEARING: Nice Ball Bearing Co., Philadelphia, Pa., offers a sealed bearing of a new design that involves use of an oil resistant, rubber-coated fabric in contact with specially formed metal shield. It has been applied to series 1600 ground all over precision annular bearings and series 3000, unground radials.

Check No. 26 on Reply Card for more Details

FOR FAST DELIVERY: Centro-Matic electric motor operated drum pump, model 1837, is offered by Lincoln Engineering Co., St. Louis 20, Mo., for use with original 55-gallon barrels or 400-pound drums in conjunction with their centralized single line lubrication system. They are designed for use with the company's lubrication systems where compressed air is not available or where electrically powered and controlled equipment is preferred.

Check No. 27 on Reply Card for more Details

SWIVEL STOOLS: Pollard Brothers Mfg. Co. Inc., Chicago 30, Ill., have redesigned their swivel stool. It has a frame constructed of steel angles riveted and a solid wood seat in either the round or saddle seat. All stools can be fitted with a back rest if desired.

Check No. 28 on Reply Card for more Details

PORTABLE DRILL PRESS: Port-A-Drill, a portable drill press designed for use with any ⅜ to ½-inch electric drill is announced by Sudenga Iron Works, George, Iowa. It may be used as a shop tool, on the workbench or may be dismounted to secure drill press action in hard to reach places. The drill is held in place by a patented clamp.

Check No. 29 on Reply Card for more Details

FLEXIBLE STRAIGHT EDGE: Regele straight edge, offered by M-M-A Inc., Lancaster, Pa., is made of SAE 1095 steel, hardened and tempered to 40/45 Rockwell C and precision is provided for by grinding its edges to a tolerance of 0.005-inch. It is available in 36, 48 and 75-inch lengths.

Check No. 30 on Reply Card for more Details

LARGER DIALS: Hydroway Scales Inc., Detroit 19, Mich., announces the addition of 24 and 30-inch dials to its line of hydraulic crane scales. These scales function on the static pressure principle and are of compact design.

Check No. 31 on Reply Card for more Details

FOR FAST ASSEMBLY: Designated as PT pull-through type and 9SP self-plugging type, two new blind rivets are announced by Huck Mfg. Co., Detroit 7, Mich. Both types are available in 1/8, 5/32, 3/16 and 1/4-inch diameters and are furnished in aluminum alloys or cadmium-plated mild steel with brazier or 100 degree countersunk heads. The pull-through type rivets have no minimum grip limitation, the self-plugging type have a grip range of 0.140-inch for any grip increment.

Check No. 32 on Reply Card for more Details

FOR JOINTING BRICK: Electro Chemical Supply & Engineering Co., Emmaus, Pa., announces a new thermosetting synthetic resin cement, Lecite. It is inert to solvents, fats, oils, greases, alkalis and acids. It is useful for jointing acid-proof brick and pipe in construction of neutralizers, tanks, etc.

Check No. 33 on Reply Card for more Details

CONTROLS FOR CRANES: For use on the bridge motions of high speed cranes and for man trolleys of ore and coal bridges, etc., Electric Controller & Mfg. Co., Cleveland 4, O., announces the EC&M safety dynamic braking crane bridge-stop. When power fails or overload relays trip, it converts the driving motors into generators to stop the crane quickly.

Check No. 34 on Reply Card for more Details

ELIMINATES WEAR: Fiber-Cushioned snagging wheels, made by Mid-West Abrasive Co., Owosso, Mich., are designed to eliminate wear on the grinding machine arbors and to promote smooth operation. The shock absorbing liners are an integral part of the wheel's matrix and come in two thicknesses—1/16-inch for wheels with 6-inch arbor holes or larger and 1/32-inch for portable snagging wheels with ⅝-inch arbor holes.

Check No. 35 on Reply Card for more Details

SPEEDS INSPECTION: Haas Corp., Mendon, Mich., is marketing the desk Magnalit, a new visual aid to speed up inspection and assembly of small parts. It consists of a large 5-inch lens set in a plastic head with two fluorescent lights built in on the underside. Flexible arm mountings permit instant adjustment, leaving both hands free.

Check No. 36 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

75. Production Machines

Hardinge Brothers, Inc.—4-page illustrated bulletin SMP presents line of high speed precision production machines with special application for manufacturers of screw machine products. These machines feature initial low cost with high speed and sustained accuracy and permit use of low-labor-cost operators for production of precision parts.

76. Baling Presses

Apex Steel Corp.—4-page illustrated pamphlet "Hy-Cal Baling Presses" deals with model No. 225 horizontal heavy-duty hydraulic baler for rapid handling of bulky scrap, large industrial stampings and clippings, automotive bodies, steel drums, wire and similar materials and with model 250 vertical one-stroke baler for handling light metals and materials.

77. Air Diffuser

Anemostat Corp.—4-page illustrated bulletin No. 29 discusses performance and application of square type E aspirating air diffuser and how it provides draftless diffusion over full 360-degree arc. Also described are units for flush mounting on acoustical tile ceilings, models with flange mounting for regular ceilings, and snap-on diffuser and equalizer assembly for quick and easy installation.

78. Low Heat Welding Alloys

Eutectic Welding Alloys Corp.—8-page illustrated "Eutectic Directory 1950" contains metal-joining information on over 100 low-temperature welding alloys for production and specialized uses. Included are data on EutecRods for torch welding, EutecTrodes for arc welding and EutecStaintrodes for arc welding stainless steel.

79. Blowers & Exhausters

Buffalo Forge Co.—8-page illustrated bulletin 3014-D presents information on types E and RE electric blowers and exhausters that are available in twelve sizes in capacities to 5500 cfm at pressures up to 2 psi. They are designed for shops where air is required for oil or gas furnaces, for cupola work and for intermittent service such as supplying air to forge fires.

80. Fine-Screen Strainers

Yarnall-Waring Co.—4-page illustrated bulletin S-202 is revised publication on Yarway fine screen strainers that are designed to protect pipeline systems against rust, scale and dirt that would interfere with proper operation of steam traps and reducing valves. Various data including sizes, pressures, temperatures, weaves and perforations are tabulated.

81. Geared Motors

Sterling Electric Motors, Inc.—4-page illustrated bulletin No. 161A and price sheets present information on line of Slo-Speed geared motors which provide constant slow speed. They incorporate herringbone rotor, lubricated-for-life heavy-duty ball bearings, compact design and positive lubrication.

82. Truck-Mounted Crane

American Steel Dredge Co., Wayne Crane Div.—8-page illustrated form No. 413 features ½-yd 10-ton model 44 Corsair crane. Unit can be converted to shovel, trench hoe, dragline, clamshell, magnet, pile driver or crane. Truck mounted, it incorporates tandem drive with ten speeds forward and two reverse.

83. Casters & Wheels

Kilbourne & Jacobs Mfg. Co.—28-page illustrated catalog No. 115 covers line of casters and wheels for industrial, commercial and institutional use. Line includes swivel and rigid casters of both stem and plate types, with either malleable iron or steel forks. Wheels are offered in sizes from 3½ to 36 in. in diameter and in capacities up to 2 tons.

84. Metal Cleaner

Neilson Chemical Co.—4-page illustrated folder form No. 49-59 explains use of concentrated export grade Metalprep wipe-off type rust remover and metal cleaner. It is suitable for preparing iron, steel, aluminum, terneplate, Galvaneal, galvanized iron and other metals for application of paint.

85. Clutches

Mercury Clutch Div., Automatic Steel Products Inc.—8-page illustrated bulletin No. 195 explains features and operation of clutch which controls automatically the application of electric motor or gasoline engine torque to driven load. It automatically brings maximum torque of power plant to driven load during starting period.

86. Milling Machines

Cincinnati Milling Machine Co.—36-page illustrated publication No. M-1670 contains complete data on plain and duplex type Hydromatic milling machines. These heavy-duty fixed bed units are designed primarily for quantity production of identical parts and are available in 18 sizes having from 24 to 90-in. table travel.

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87. Recloser

Westinghouse Electric Corp. — 4-page illustrated bulletin B-4339 explains operation of 100-amp type GR recloser. Diagrams and semipictorial drawings help in visualizing each step. Table is given showing minimum tripping currents for five coil sizes available and maximum interrupting capacities at common operating voltages.

88. Milling Machine

Taylor & Fenn Co.—4-page illustrated pamphlet "Taylor & Fenn M-80" deals with 4-in. stroke duplex spline milling machine which is designed to use cutters of small diameter for efficient and accurate cutting of splines or keyways and various other types of work for which machine is adapted. Standard V-block fixtures and typical production samples are shown.

89. High-Strength Steel

Jones & Laughlin Steel Corp.—32-page illustrated brochure "The Transportation Steel" describes Otiscoloy low-alloy high-strength steel for use in manufacture of trailer trucks, buses and light trucks, tank semi-trailers, dump trucks, road machinery, power shovels and cranes, mining equipment and similar products.

90. Machine Tool Accessories

Cincinnati Gilbert Machine Tool Co.—6-page illustrated bulletin No. 749 presents descriptions and specifications of accessories and attachments for all types of Gilbert horizontal boring, drilling and milling machines.

91. Market Research Analysis

International Business Machines Corp.—4-page form No. 52-5724-O tells of IBM service bureaus' facilities for market research analysis which includes questionnaire layout preparation and recording and analysis of facts sampled.

92. Lubricating Devices

Trico Fuse Co.—4-page illustrated catalog 4800-OB describes line of lubricating devices including constant level, gravity feed, wick feed, thermal, bottle, Micro-Matic, Vari-Feed and under-feed oilers; combination oil cups and oil gages.

93. Press Room Equipment

U. S. Tool Co.—14-page illustrated bulletin No. 70 deals with slide and roll feeds, straighteners, stock reels, coil cradles, oilers, wipers and other press room equipment. Specifications, construction features and operating data are included.

94. Centrifugal Castings

Sandusky Foundry & Machine Co.—4-page bulletin 542 points out facilities for producing nonferrous centrifugal castings in diameters from 3 to 54 in. and in lengths up to 327 in. Alloy designations, composition ranges and physical properties are detailed in single chart.

95. Gun Drills

National Twist Drill & Tool Co.—4-page illustrated folder "Target Gun Drills" deals with deep hole drills which feature continuous piloting at cutting point, no dead center or zero speed area, and rigid shank construction. Drills can be furnished with carbide insert at cutting edge if desired.

96. Brass Cleaner

Enthone, Inc.—2-page bulletin describes alkaline cleaner for degreasing of nonferrous metals including copper, brass, and tin and lead alloys. Alkalies are blended with surface active materials to inhibit tarnishing, clean in hard water, rinse freely and provide powerful cleaning action.

97. Iron-Clad Concrete Floor

Master Builders Co.—36-page illustrated booklet MP-4a describes Masterplate floor having iron armored surface about ⅛-in. thick and which is spark resistant, nondusting, corrosion resistant and easy to clean. This type of flooring can be produced with nonslip finish and in any one of eleven colors.

98. Flame Cutting

Joseph T. Ryerson & Son, Inc.—4-page illustrated booklet entitled "Electric-Eye Flame Cutting" shows intricate and unusual steel shapes which have been custom cut with electric eye flame cutting equipment. Typical irregular shapes include diesel locomotive pants, sprockets, grinding wheels, boom bars and crankshafts.

99. Centrifugal Fire Pumps

Peerless Pump Div., Food Machinery & Chemical Corp.—24-page illustrated bulletin No. B-1500 covers single and two-stage centrifugal fire pumps and their methods of drive and application. Selection charts present capacity, heads, horsepower range and speed of each pump for each type of drive which can be electric motor, diesel or gasoline engine or steam turbine.

100. Steel Fabrications

Manufacturers & Fabricators, Inc.—4-page illustrated circular "The Sign of Quality" shows examples of stainless and carbon steel equipment built to specifications. Included are rectangular annealing furnace, stainless steel tubing, stainless steel varnish kettle and stainless clad plate-type starch storage tank.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

TEEL Numbers

21	41	61	81
22	42	62	82
23	43	63	83
24	44	64	84
25	45	65	85
26	46	66	86
27	47	67	87
28	48	68	88
29	49	69	89
30	50	70	90
31	51	71	91
32	52	72	92
33	53	73	93
34	54	74	94
35	55	75	95
36	56	76	96
37	57	77	97
38	58	78	98
39	59	79	99
40	60	80	100

STEEL 12-26-49

Penton Building, Cleveland 13, Ohio

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Market Summary

MORE careful buying of steel, changes in product design and in fabricating methods are likely to result from the revisions in extra charges now being announced by steel producers. Metalworking executives are studying the changes closely to determine how they can offset the higher costs by economies in specifying, handling and manufacturing methods. Full import of the advances in extras will not be known for several weeks. Impact on fabricators' costs must await issuance of complete extra cards by the producers. Users know their steel will cost more, but how much will remain an unanswered question pending detailed study of all factors.

PRICES— Most of the larger steelmakers followed the lead of U. S. Steel subsidiaries within a week. Smaller interests are going along. Indications are the industry-wide price adjustment will be pretty well completed by turn of the year. Generally, the pattern set by the U. S. Steel is being followed, increases, including mill prices and extras, averaging around $4 per ton. However, some departures from this pattern are noted and the industry-wide average increase may be higher or lower when full appraisal is possible. For that matter, average of all product prices means little since specific increases range as high as $29.50 a ton. Markups on certain popular tonnage items, considering extras, exceed the $4 average substantially.

MOTIVES— Steelmakers explain the price adjustments as not only compensating for higher production costs, including pensions, but also as a move to more realistically price their products to conform with new market conditions and modern production practice. Changes in extras, under study almost a year, especially reflect the latter. In general, the revisions in extras are designed to establish proper relationships among sizes within product ranges and among products. They also aim to place all sizes and grades on a reasonably uniform profit basis. This, to some extent, should eliminate selective selling to avoid unprofitable business as to types and sizes of particular products.

REACTION— Immediate reaction of steel buyers to the price advances is mixed. Some customer criticism of the action was voiced and a congressional investigation launched. For the most part, however, metalworking companies are withholding comment until they have had time to digest the impact on their costs. Some consumers may partially offset increases in processing extras by holding specifications to commercial quality grades, ordering in multiple lengths, etc. Similarly, packaging specifications can be modified to avoid higher charges. There is little doubt buyers hereafter will exert greater diligence and prudence in specifying. Product design may even be noticeably influenced, all-around production efficiency encouraged and closer internal control over expenditures fostered, leading to substantial overall reduction in manufacturing costs. To what extent higher steel costs will be passed along to ultimate consumers is uncertain. In final analysis, competitive conditions will dictate manufacturers' pricing policies.

COMPOSITES— Reflecting the general price advance STEEL's weighted index on finished steel rose to 155.27 from 152.52. This compares with 151.86 a year ago. The finished steel arithmetical composite advanced to $92.09 from $91.64 a week ago and compares with $95.50 a year ago. These composites are preliminary pending publication of new schedules by all producers that have already effected changes. Contrasting with the trend on finished steel, the steelmaking scrap composite declined further to $27.25 last week. This compares with $28.25 the preceding week and $43.25 a year ago. Pig iron composites held unchanged at: Basic, $45.60; No. 2 foundry, $46.10; malleable, $47.27.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Dec. 24	Change	Same Week 1948	Same Week 1947
Pittsburgh	96	None*	80	87
Chicago	96.5	— 1*	85	79.5
Eastern Pa.	85	+ 2	83.5	85
Youngstown	98	+ 3	85	80
Wheeling	91	— 8	89.5	86
Cleveland	99.5	— 6.5*	94	81
Buffalo	103.5	None	104	87.5
Birmingham	100	None	98	102
New England	85	None	86	75
Cincinnati	104	None	90	78
St. Louis	89.5	None	79.5	89.5
Detroit	106	— 1*	89	92
Western	90	— 1	..	..
Estimated national rate	94.5	None	88	86

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947.
* Change from revised rate.

News Summary—P. 15 *Engineering News—P. 45*

Composite Market Averages

	Dec. 22 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	155.27*	152.52	152.52	151.86	99.16
Index in cents per lb ..	4.206*	4.132	4.132	4.114	2.686
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$92.09*	$91.64	$91.64	$95.50	$56.73
No. 2 Fdry Pig Iron, GT	46.10	46.10	46.10	46.69	23.67
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.41	24.29
Basic Pig Iron, GT.....	45.60	45.60	45.60	46.29	23.00
Steelmaking Scrap, GT..	27.25	28.25	29.83	43.25	19.17

* Preliminary

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Dec. 22 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh ...	3.45	3.35	3.35	3.35–55	2.15
Bars, H.R., Chicago	3.35	3.35	3.35	3.35	2.15
Bars, C. F., Pittsburgh ...	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C. F., Chicago	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pittsburgh ..	3.40	3.25	3.25	3.25–30	2.10
Shapes, Std., Chicago	3.25	3.25	3.25	3.25	2.10
Plates, Pittsburgh	3.50	3.40	3.40	3.40–60	2.10
Plates, Chicago	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa. ..	3.60	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.	3.50	3.40	3.40	3.45	2.10
Plates, Claymont, Del.	3.50	3.50	3.50	3.95	2.10
Sheets, H.R., Pittsburgh ..	3.35	3.25	3.25	3.25–30	2.10
Sheets, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pittsburgh ..	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pittsburgh ..	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.25–70	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25–30	2.10
Strip, C.R., Pittsburgh...	4.00	4.00	4.00	4.00–75	2.80
Strip, C.R., Chicago	4.00–15	4.00–15	4.00–15	4.00–25	2.90
Strip, C.R., Detroit	4.20–40	4.20–25	4.20–25	4.20–50	2.90
Wire, Basic, Pittsburgh ...	4.50	4.15	4.15	4.15-4.50	2.60
Nails, Wire, Pittsburgh ...	5.30	5.15	5.15	5.15-6.30	2.55
Tin plate, box, Pittsburgh.	$7.75	$7.75	$7.75	$6.80	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$63.00	$61.00	$61.00	$61.00	$40.00
Sheet bar, mill(NT)	51.78–57.00	51.78–57.00	51.78–57.00	67.00	34.00
Wire rods, 5/32-5/16", Pitts. ..	3.85	3.40	3.40	3.40-4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$24.50
Basic, Valley	46.00	46.00	46.00	46.00	23.50
Basic, del. Phila.	49.44	49.44	49.44	50.17	25.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.00-46.50	24.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.67	25.84
No. 2 Fdry, Birmingham ..	39.38	39.38	39.38	43.38	20.38
No. 2 Fdry.(Birm.)del Cin.	46.08	46.08	46.08	49.09	24.06
Malleable, Valley	46.50	46.50	46.50	46.50	24.00
Malleable, Chicago	46.50	46.50	46.50	46.50	24.00
Charcoal, Lyles, Tenn.	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts. ..	$30.00	$31.00	$33.50	$42.75	$20.00
No. 1 Heavy Melt. E. Pa. .	24.75	24.75	26.50	45.25	18.75
No. 1 Heavy Melt. Chicago	27.00	29.00	29.50	41.75	18.75
No. 1 Heavy Melt. Valley..	31.75	31.75	32.75	42.75	20.00
No. 1 Heavy Melt. Cleve...	29.75	29.75	30.25	42.25	19.25
No. 1 Heavy Melt. Buffalo.	29.75	29.75	29.75	48.50	19.25
Rails, Rerolling, Chicago..	43.50	43.50	44.50	69.50	22.25
No. 1 Cast, Chicago.....	37.50	37.50	42.50	70.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl. .	15.50	15.50	15.75	17.00	7.75
Oven Fdry., Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	18.50	18.50	23.50	12.00
Zinc, E. St. Louis	9.75	9.75	9.75	17.50	8.25
Lead, St. Louis	11.80	11.80	11.80	21.30–35	6.35
Tin, New York	78.00	78.75	85.00	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	32.00	32.00	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham,Ala. R2, S9	38.88	39.38	....	....
Woodward,Ala. W15	38.88	39.38	....	....
Cincinnati,del.	....	46.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y. W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y. T9	....	46.50	47.00	....
Boston,del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
So.Chicago,Ill. Y1	46.00	46.50	46.50	....
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Fontana,Calif. K1	52.00	52.50	....	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del.	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del.(incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts.N.&S. sides,Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y. R2	48.00	48.50	49.00	....
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add $1 for each 0.5% Si to 11.50%)

Jackson,O. J1, G2	$59.50
Buffalo H1	60.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk,Iowa, OH & Fdry., 12½ lb, piglets, frt. allowed K2..	82.00
Wenatchee,Wash, OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$60.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.09
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, Dec. 22, 1949; cents per pound unless otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00
INGOTS, Alloy (NT)
Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 ... 51.00
BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. C3 ..... $53.00
Clairton,Pa. C3 ..... 53.00
Conshohocken,Pa. A3 .. 57.00
Ensley,Ala. T2 ..... 53.00
Fairfield,Ala. T2 ..... 53.00
Fontana,Calif. K1 ..... 71.00
Gary,Ind. C3 ..... 53.00
Johnstown,Pa. B2 ..... 53.00
Lackawanna,N.Y. B2 ... 53.00
Munhall,Pa. C3 ..... 53.00
Sharon,Pa. S3 ..... 57.00
So.Chicago,Ill. C3 ..... 53.00
So.Duquesne,Pa. C3 ... 53.00
Carbon, Forging (NT)
Bessemer,Pa. C3 ..... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2 ..... 63.00
Clairton,Pa. C3 ..... 63.00
Cleveland R2 ..... 63.00
Conshohocken,Pa. A3 .. 63.00
Detroit R7 ..... 61.00
Ensley,Ala. T2 ..... 63.00
Fairfield,Ala. T2 ..... 63.00
Fontana,Calif. K1 ..... 80.00
Gary,Ind. C3 ..... 63.00
Geneva,Utah G1 ..... 63.00
Houston,Tex. S5 ..... 69.00
Ind. Harbor,Ind. I-2 ... 61.00
Johnstown,Pa. B2 ..... 63.00
Lackawanna,N.Y. B2 ... 63.00
Munhall,Pa. C3 ..... 63.00
So.Duquesne,Pa. C3 ... 63.00
So.Chicago,Ill. C3, R2.. 63.00
Warren,O. C17 ..... 61.00
Alloy (NT)
Bethlehem,Pa. B2 .... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2, T7..... 63.00
Conshohocken,Pa. A3 .. 65.00
Detroit R7 ..... 63.00
Fontana,Calif. K1 .... 82.00
Gary,Ind. C3 ..... 63.00
Houston,Tex. S5 ..... 71.00
Johnstown,Pa. B2 ..... 63.00
Lackawanna,N.Y. B2 .. 63.00
Massillon,O. R2 ..... 63.00
Midland,Pa. C18 ..... 66.00
Munhall,Pa. C3 ..... 63.00
Sharon,Pa. S3 ..... 66.00
So.Chicago,Ill. C3, R2.. 63.00
So.Duquesne,Pa. C3 ... 63.00
Warren,O. C17 ..... 63.00
SHEET BARS (NT)
Mansfield,O. E6..(GT) $58.00
Sharon,Pa. S3 ..... 57.00
ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Ind.Harbor,Ind. I-2 ... 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 .... 76.00
SKELP
Aliquippa,Pa. J5 ..... 3.15
Munhall,Pa. C3 ..... 3.15
Warren,O. R2 ..... 3.15
Youngstown C3, R2 .... 3.15
WIRE RODS
AlabamaCity,Ala. R2 ... 3.85
Buffalo W12 ..... 3.40
Cleveland A7 ..... 3.85
Donora,Pa. A7 ..... 3.85
Fairfield,Ala. T2 ..... 3.85
Houston,Tex. S5 ..... 3.95
Ind.Harbor,Ind. Y1 .... 3.85
Johnstown,Pa. B2 ..... 3.40
Joliet,Ill. A7 ..... 3.85
Los Angeles B3 ..... 4.20
Monessen,Pa. P7 ..... 3.85
Pittsburg,Calif. C11 .... 4.50
Portsmouth,O. P12 .... 3.40
So.Chicago,Ill. R2 ..... 3.85
SparrowsPoint B2 ..... 3.50
Sterling,Ill.(1) N15 .... 3.40
Struthers,O. Y1 ..... 3.85
Torrance,Calif. C11 .... 4.65
Worcester,Mass. A7 .... 4.15
STRUCTURALS
Wide Flange
Bethlehem,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .... 3.45
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40
H-S., L-A., Wide Flange
Munhall,Pa. C3 ..... 5.10
So.Chicago,Ill. C3 ..... 5.10

H.-S. Low-Alloy Stand. Shapes
Aliquippa,Pa. J5 ..... 5.15
Bessemer,Ala. T2 ..... 5.15
Bethlehem,Pa.(14) B2 .. 5.20
Clairton,Pa. C3 ..... 5.15
Fairfield,Ala. T2 ..... 5.15
Fontana,Calif. K1 ..... 5.50
Gary,Ind. C3 ..... 5.15
Ind.Harbor,Ind. I-2 .... 4.95
Ind.Harbor,Ind. Y1 .... 5.15
Johnstown,Pa. B2 ..... 5.20
Lackawna,N.Y.(14) B2 .. 5.20
Munhall,Pa.(14) C3 .... 5.15
So.Chicago,Ill.(14) C3 .. 5.15
Struthers,O. Y1 ..... 5.15
Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 ..... 3.40
Bessemer,Ala. T2 ..... 3.40
Bethlehem,Pa. B2 ..... 3.30
Clairton,Pa. C3 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 3.80
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Houston,Tex. S5 ..... 3.65
Ind.Harbor,Ind. I-2 .... 3.25
Johnstown,Pa. B2 ..... 3.30
KansasCity,Mo. S5 .... 3.85
Lackawanna,N.Y. B2 ... 3.30
LosAngeles B3 ..... 3.85
Minnequa,Colo. C10 .... 3.75
Munhall,Pa. C3 ..... 3.40
Niles,Calif.(22) P1 .... 3.97
Phoenixville,Pa. P4 .... 3.30
Portland,Oreg. O4 ..... 3.90
Seattle B3 ..... 3.90
So.Chicago,Ill. W14 .... 3.25
So.Chicago,Ill. C3 ..... 3.40
So.SanFrancisco B3 .... 3.80
Torrance,Calif. C11 .... 4.00
Weirton,W.Va. W6 ..... 3.40
Alloy Stand. Shapes
Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05
SHEET STEEL PILING
Ind.Harbor,Ind. I-2 .... 4.05
Lackawanna,N.Y. B2 ... 4.05
Munhall,Pa. C3 ..... 4.20
So.Chicago,Ill. C3 ..... 4.20
Weirton,W.Va. W6 ..... 4.05
PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 3.50
Aliquippa,Pa. J5 ..... 3.50
Ashland,Ky.(15) A10 ... 3.40
Bessemer,Ala. T2 ..... 3.50
Clairton,Pa. C3 ..... 3.50
Claymont,Del. W16 .... 3.50
Cleveland J5, R2 ..... 3.50
Coatesville,Pa. L7 ..... 3.60
Conshohocken,Pa. A3 ... 3.50
Ecorse,Mich. G5 ..... 3.65
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.50
Geneva,Utah G1 ..... 3.50
Harrisburg,Pa. C5 ..... 3.75
Houston,Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2 .... 3.40
Ind.Harbor,Ind. Y1 .... 3.50
Johnstown,Pa. B2 ..... 3.50
Lackawanna,N.Y. B2 .... 3.50
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.50
Pittsburgh J5 ..... 3.50
Seattle B3 ..... 4.30
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. W14 .... 3.40
So.Chicago,Ill. C3 ..... 3.50
SparrowsPoint,Md. B2 .. 3.50
Steubenville,O. W10 .... 3.50
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 ..... 3.50
Youngstown C3, Y1 .... 3.50
PLATES (Universal Mill)
Fontana,Calif. K1 ..... 4.30
PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 ... 4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown,Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 ..... 4.40
SparrowsPoint,Md. B2 .. 4.40
PLATES, Ingot Iron
Ashland,cl(15) A10 .... 3.65
Ashland,lcl(15) A10 .... 4.15
Cleveland,cl R2 ..... 4.10
Warren,O.,cl R2 ..... 4.10
PLATES, Wrought Iron
Economy,Pa. B14 ..... 7.85
PLATES,High-Strength Low-Alloy
Aliquippa, Pa. J5 ..... 5.35
Bessemer,Ala. T2 ..... 5.35
Clairton,Pa. C3 ..... 5.35
Cleveland J5, R2 ..... 5.35
Conshohocken,Pa. A3 ... 5.20
Ecorse,Mich. G5 ..... 5.45
Fairfield,Ala. T2 ..... 5.35
Fontana,Calif. K1 ..... 5.80
Gary,Ind. C3 ..... 5.35
Geneva,Utah G1 ..... 5.35
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2 .... 5.20
Ind.Harbor,Ind. Y1 ..... 5.35
Johnstown,Pa. B2 ..... 5.35
Munhall,Pa. C3 ..... 5.35
Pittsburgh J5 ..... 5.35
Sharon,Pa. S3 ..... 5.35
So.Chicago,Ill. C3 ..... 5.35
SparrowsPoint,Md. B2 .. 5.35
Warren,O. R2 ..... 5.35
Youngstown Y1 ..... 5.35
FLOOR PLATES
Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 ... 4.55
Harrisburg,Pa. C5 ..... 4.55
Ind.Harbor,Ind. I-2 .... 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55
BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ... 3.45
Aliquippa,Pa. J5 ..... 3.45
Alton,Ill.(1) L1 ..... 3.35
Ashland,Ky. (17) A10... 3.35
Atlanta,Ga. A11 ..... 3.50
Bessemer,Ala. T2 ..... 3.45
Buffalo R2 ..... 3.45
Canton,O. R2 ..... 3.45
Clairton,Pa. C3 ..... 3.45
Cleveland R2 ..... 3.45
Ecorse,Mich. G5 ..... 3.55
Emeryville,Calif. J7 .... 4.10
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.75
Ind.Harbor,Ind. I-2 .... 3.35
Ind.Harbor,Ind. Y1 ..... 3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 3.95
Lackawanna,N.Y. B2 ... 3.45
LosAngeles B3 ..... 4.05
Marion,O. P11 ..... 3.35
Midland,Pa. C18 ..... 3.45
Milton,Pa. B6 ..... 3.35
Minnequa,Colo. C10 .... 3.85
Niles,Calif. P1 ..... 4.05
N.Tonawanda,N.Y. B11 .. 3.35
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.10
Seattle B3, N14 ..... 4.10
So.Chicago C3, R2 ..... 3.45
So.Chicago,Ill. W14 .... 3.35
So.Duquesne,Pa. C3 .... 3.45
S.SanFran.,Cal. B3 .... 4.10
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Weirton,W.Va. W6 ..... 3.45
Youngstown C3, R2 .... 3.45
BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 3.45
Atlanta,Ga. A11 ..... 3.50
Bethlehem,Pa.(2) B2 .... 3.65
Johnstown,Pa. B2 ..... 3.35
Lackawanna,N.Y. B2 ... 3.35
Niles,Calif. P1 ..... 4.05
Pittsburgh(23) J5 ..... 3.45
Portland,Oreg. O4 ..... 4.10
SanFrancisco S7 ..... 3.90
Weirton,W.Va. W6 ..... 3.35
BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 3.75
Buffalo R2 ..... 3.95
Canton,O. R2, T7..... 3.95
Clairton,Pa. C3 ..... 3.95
Ecorse,Mich. G5 ..... 4.05
Fontana,Calif. K1 ..... 4.75
Gary,Ind. C3 ..... 3.95
Houston,Tex. S5 ..... 4.15
Ind.Harbor,Ind. I-2 .... 3.75
Ind.Harbor,Ind. Y1 ..... 3.95
Johnstown,Pa. B2 ..... 3.95
KansasCity,Mo. S5 .... 4.35
Lackawanna,N.Y. B2 ... 3.95
LosAngeles B3 ..... 4.80
Massillon,O. R2 ..... 3.95
Midland,Pa. C18 ..... 3.95
So.Chicago C3, R2..... 3.95
So.Chicago,Ill. W14 .... 3.75
So.Duquesne,Pa. C3 ..... 3.95
Struthers,O. Y1 ..... 3.95
Warren,O. C17 ..... 3.75
Youngstown C3 ..... 3.95
BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 ..... 4.20
Fontana,Calif. K1 ..... 4.75
Gary,Ind. C3 ..... 4.20
Youngstown C3 ..... 4.20
BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.20
Bessemer,Ala. T2 ..... 5.20
Bethlehem,Pa. B2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland R2 ..... 5.20
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 ..... 6.15
Gary,Ind. C3 ..... 5.20
Ind.Harbor,Ind. Y1 .... 5.20
Ind.Harbor,Ind. I-2 .... 5.10
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 ... 5.20
Pittsburgh J5 ..... 5.20
So.Duquesne,Pa. C3 .... 5.20
Struthers,O. Y1 ..... 5.20
Youngstown C3 ..... 5.20
BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 ..... 4.00
Ambridge,Pa. W18..... 4.00
BeaverFalls, M12, R2... 4.00
Buffalo B5 ..... 4.00
Camden,N.J. P13 ..... 4.48
Carnegie,Pa. C12 ..... 4.00
Chicago W18 ..... 4.00
Cleveland A7, C20..... 4.00
Cumberland,Md. C19 ... 3.95
Detroit P17 ..... 4.15
Donora,Pa. A7 ..... 4.00
Ecorse,Mich. G5 ..... 4.30
Elyria,O. W8 ..... 4.00
FranklinPark,Ill. N5 ... 4.00
Gary,Ind. R2 ..... 4.00
Hammond,Ind. L2, M13. 4.00
Hartford, Conn. R2 .... 4.40
Harvey,Ill. B5 ..... 4.00
Indianapolis M13 ..... 4.20
LosAngeles R2 ..... 5.40
Mansfield,Mass. B5 .... 4.40
Massillon,O. R2, R8.... 4.00
Midland,Pa. C18 ..... 4.00
Monaca,Pa. S17 ..... 4.00
Newark,N.J. W18 ..... 4.40
Plymouth,Mich. P5 ..... 4.25
Pittsburgh J5 ..... 3.95
Putnam,Conn. W18 .... 4.40
Readville,Mass. C14 .... 4.40
St.Louis,Mo. M5 ..... 4.55
So.Chicago,Ill. W14 .... 4.00
SpringCity,Pa.(5) K3 .. 4.48
Struthers,O. Y1 ..... 4.00
Waukegan,Ill. A7 ..... 4.00
Youngstown F3, Y1.... 4.00
BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 ..... 4.65
Ambridge,Pa. W18 ..... 4.65
BeaverFalls,Pa. M12.... 4.65
Bethlehem,Pa. B2 ..... 4.65
Buffalo B5 ..... 4.65
Canton,O. R2, T7..... 4.65
Carnegie,Pa. C12 ..... 4.65
Chicago W18 ..... 4.65
Cleveland A7, C20..... 4.65
Detroit P17 ..... 4.80
Donora,Pa. A7 ..... 4.65
Elyria,O. W8 ..... 4.65
Gary,Ind. R2 ..... 4.65
Hammond,Ind. L2, M13. 4.65
Hartford,Conn. R2 ..... 4.95
Harvey,Ill. B5 ..... 4.65
Indianapolis M13 ..... 4.85
Lackawanna,N.Y. B2 .. 4.65
Mansfield,Mass. B5 ..... 4.95
Massillon,O. R2, R8..... 4.65
Midland,Pa. C18 ..... 4.65
Monaca,Pa. S17 ..... 4.65
Newark,N.J. W18 ..... 4.95
So.Chicago,Ill. R2, W14. 4.65
Struthers,O. Y1 ..... 4.65
Waukegan,Ill. A7 ..... 4.65
Worcester,Mass. A7 .... 4.95
Youngstown F3, Y1 .... 4.65
BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ... 3.45
Alton,Ill.(6) L1 ..... 3.35
Atlanta,Ga. A11 ..... 3.50
Buffalo R2 ..... 3.45
Cleveland R2 ..... 3.45
Emeryville,Calif. J7 .... 4.10
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.75
Ind.Harbor,Ind. I-2 .... 3.35
Ind.Harbor,Ind. Y1 ..... 3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 3.95
Lackawanna,N.Y. B2 ... 3.45
LosAngeles B3 ..... 4.05
Minnequa,Colo. C10 .... 4.25
Niles,Calif. P1 ..... 4.05
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.10
Seattle,Wash. B3, N14.. 4.10
So.Chicago,Ill. R2 ..... 3.45
So.Duquesne,Pa. C3 ..... 3.45
So.SanFrancisco B3 .... 4.10
SparrowsPoint,Md. B2 .. 3.45
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Youngstown C3, R2..... 3.45
BARS, Reinforcing (Fabricated; to Consumers)
Huntington,W.Va. W7 .. 4.50
Johnstown, ¼-1" B2 ... 4.25
LosAngeles B3 ..... 5.00
Marion,O. P11 ..... 4.25
Pittsburgh J5 ..... 4.25
Seattle B3, N14 ..... 5.00
So.SanFrancisco B3 .... 5.00
SparrowsPt., 1⅛-1¼" B2. 4.83
SparrowsPt., ¼-1" B2 .. 4.25
RAIL STEEL BARS
ChicagoHts.,Ill(3) I-2 .. 3.25
FortWorth,Tex.(26) T4.. 4.33
Hntngtn,W.Va.(3) W7 .. 3.35
Moline,Ill.(3) R2 ..... 3.35
Williamsport(2,3) S19 .. 3.35
Williamsport(4) S19 .... 3.85
BARS, Wrought Iron
Economy,Pa.(S.R.)B14.. 9.50
Economy,Pa.(D.R.)B14. 11.00
Economy(Stablt) B14 .. 11.30
McK.Rks.(S.R.) L5 .... 8.60
McK.Rks.(D.R.) L5 .... 11.25
McK.Rks.(Staybolt) L5. 12.75
SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ... 3.35
Ashland,Ky.(8) A10 .... 3.25
Butler,Pa. A10 ..... 3.25
Cleveland J5, R2 ..... 3.35
Conshohocken,Pa. A3 ... 3.35
Ecorse,Mich.(8) G5 .... 3.45
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.15
Gary,Ind. C3 ..... 3.35
Ind.Harbor,Ind. I-2 .... 3.25
Ind.Harbor,Ind. Y1 .... 3.35
Irvin,Pa. C3 ..... 3.35
Kokomo,Ind. C16 ..... 3.35
Lackawanna,N.Y. B2 ... 3.35
Munhall,Pa. C3 ..... 3.35
Niles,O. M4 ..... 3.75
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Sharon,Pa. S3 ..... 3.35
So.Chicago,Ill. W14 .... 3.25
SparrowsPoint,Md. B2 .. 3.35
Steubenville,O. W10 .... 3.35
Torrance,Calif. C11 .... 4.05
Warren,O. R2 ..... 3.35
Weirton,W.Va. W6 ..... 3.35
Youngstown C3, Y1 .... 3.35
SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 .... 4.50
Dover,O. R1 ..... 5.00
Fairfield,Ala. T2 ..... 4.15
Ind.Harbor,Ind. I-2 .... 4.15
Kokomo,Ind. C16 ..... 4.25
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.15
Niles,O. M4 ..... 4.65
Torrance,Calif. C11 .... 5.15
SHEETS, Cold-Rolled Steel (Commercial Quality)
Butler,Pa. A10 ..... 4.00
Cleveland J5, R2 ..... 4.10
Ecorse,Mich. G5 ..... 4.20
Fairfield,Ala. T2 ..... 4.10
Follansbee,W.Va. F4 .... 4.10
Fontana,Calif. K1 ..... 4.90
Gary,Ind. C3 ..... 4.10
GraniteCity,Ill. G4 ..... 4.20
Ind.Harbor,Ind. I-2 .... 4.00
Ind.Harbor,Ind. Y1 .... 4.10
Irvin,Pa. C3 ..... 4.10
Lackawanna,N.Y. B2 .... 4.10
Middletown,O. A10 .... 4.00
Pittsburg,Calif. C11 .... 5.05
Pittsburgh J5 ..... 4.10
SparrowsPoint,Md. B2 .. 4.10
Steubenville,O. W10 .... 4.10
Warren,O. R2 ..... 4.10
Weirton,W.Va. W6 ..... 4.10
Youngstown Y1 ..... 4.10
SHEETS, Cold-Rolled, High-Strenath Low-Alloy
Cleveland J5, R2 ..... 6.20
Ecorse,Mich. G5 ..... 6.25
Fontana,Calif. K1 ..... 6.95
Gary,Ind. C3 ..... 6.20
Ind.Harbor,Ind. Y1 .... 6.20
Ind.Harbor,Ind. I-2 .... 6.05
Irvin,Pa. C3 ..... 6.20
Lackawanna,N.Y. B2 .... 6.20
Pittsburgh J5 ..... 6.20
SparrowsPoint,Md. B2 .. 6.20
SparrowsPoint,Md. B2 .. 6.05
Warren,O. R2 ..... 6.20
Weirton,W.Va. W6 ..... 6.20
Youngstown Y1 ..... 6.20

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....5.05
Conshohocken,Pa. A3 ...4.95
Ecorse,Mich. G5 .....5.15
Fairfield,Ala. T2 .....5.05
Fontana,Calif. K1 .....6.64
Gary,Ind. C3 .....5.05
Ind.Harbor,Ind. I-2 ....4.95
Ind.Harbor,Ind. Y1 ....5.05
Irvin,Pa. C3 .....5.05
Lackawanna,N.Y. B2 ...5.05
Pittsburgh J5 .....5.05
Sharon,Pa. S3 .....5.05
So.Chicago,Ill. C3 .....5.05
SparrowsPoint,Md. B2 ...5.05
Warren,O. R2 .....5.05
Weirton,W.Va. W6 .....5.05
Youngstown C3 Y1 .....5.05

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2 ..4.40
Ashland,Ky.(8) A10 ....4.40
Canton,O. R2 .....4.40
Delphos,O. N16 .....5.65
Dover,O. R1 .....5.65
Fairfield,Ala. T2 .....4.40
Gary,Ind. C3 .....4.40
GraniteCity,Ill. G4 ....4.60
Ind.Harbor,Ind. I-2 ....4.40
Irvin,Pa. C3 .....4.40
Kokomo,Ind. C16 .....4.80
MartinsFerry,O. W10 ..4.40
Niles,O. N12 .....4.40
Pittsburg,Calif. C11 ....5.15
SparrowsPoint,Md. B2 ..4.40
Steubenville,O. W10 ....4.40
Torrance,Calif. C11 ....5.15
Weirton,W.Va. W6 ....4.40

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. C3 .....6.75
SparrowsPoint,Md. B2 ..6.75

SHEETS, Galvannealed Steel

Canton,O. R2 .....4.95
Irvin,Pa. C3 .....4.95
Kokomo,Ind. C16 .....5.05
Niles,O. N12 .....4.95

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10 .....4.65
Middletown,O. A10 ....4.65

SHEETS, Electro Galvanized

Cleveland R2 (28) 5.25
Niles,O. R2 (28) 5.25
Weirton,W.Va. W6 .....5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2 ....5.05

SHEETS, Culvert, No. 16 Flat

	Cu Alloy	Cu Fe
Ashland A10	5.00	...
Canton,O. R2	*5.25*	*5.70*
Fairfield,Ala. T-2.	*5.20*	*5.45*
Gary C3	*5.20*	*5.45*
GraniteCity G4 ..	5.40	5.70
Irvin C3	*5.20*	*5.45*
Kokomo C16	5.40	...
MartinsFy,O. W10	*5.20*	*5.45*
Pittsburg,Cal. C11.	*5.95*	...
SparrowsPt. B2	*5.20*	...
Torrance,Cal. C11.	*5.95*	...

SHEETS, Culvert, No. 16 Flat Ingot Iron

Ashland,Ky. A10 .....5.25

SHEETS, Well Casing

Torrance,Calif. C11 ....*4.85*
Youngstown C3 .....*3.85*

SHEET, Drum Body

Pittsburg,Calif. C11 ....*3.95*
Torrance,Calif. C11 ....*3.95*

SHEETS, ALUMINIZED

Butler,Pa. A10 .....7.75

SHEETS, Long Terne, Steel (No. 10; Commercial Quality)

BeechBotm.,W.Va. W10.4.80
Gary,Ind. C3 .....4.80
Mansfield,O. E6 .....4.80
Middletown,O. A10 ....4.80
Weirton,W.Va. W6 ....4.80

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3 .....$17.50
Yorkville,O. W10 ....17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2 ....$6.75
Gary,Ind. C3 .....6.65
Ind.Harbor,Ind. I-2 ....6.65
Irvin,Pa. C3 .....6.65
Weirton,W.Va. W6 ....6.65
Yorkville,O. W10 .....*6.50*

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10 ....$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3 .....$8.10
Yorkville,O. W10 .....8.10

SHEETS, Coated Ternes, 12 lb

Yorkville,O. W10 .....8.95

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....5.20

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.45	$6.70	$7.00
Fairfield,Ala. T2	6.55	6.80	7.10
Gary,Ind. C3	6.45	6.70	7.00
GraniteCity,Ill. G4	6.65	6.90	7.20
Ind.Harbor,Ind. I-2, Y1	6.45	6.70	7.00
Irvin,Pa. C3	6.45	6.70	7.00
Niles,O. R2	6.45	6.70	7.00
Pittsburg,Calif. C11	7.20	7.45	7.75
SparrowsPoint,Md. B2	6.55	6.80	7.10
Weirton,W.Va. W6	6.45	6.70	7.00
Yorkville,O. W10	6.45	6.70	7.00

SHEETS, SILICON (24 Ga. Base)

	Field	Arm.	Elec.	Motor	Dyn.
BeechBottom,W.Va. W10 (27)					
Cut lengths	...	*6.45*	*6.95*	*7.95*	*8.75*
Coils	...	*6.95*	*7.45*	*8.45*	*9.25*
Brackenridge,Pa. A4 (27)					
Cut Lengths	...	...	6.95	7.95	8.75
Coils	...	...	7.45	8.45	9.25
Follansbee,W.Va. F4	...	...	7.70	8.45	9.25
GraniteCity,Ill. G4	...	...	6.15	6.90	7.70
Ind.Harbor,Ind. I-2	5.15	5.45	5.95	...	...
Mansfield,O. E6	5.15	5.45	5.95	6.70	...
Niles,O. M4	5.65	5.95	6.45	...	...
Niles,O. N12	...	5.45	5.95	...	...
Toronto,O. F4	...	...	7.70	8.45	9.25
Vandergrift,Pa. C3 (27)					
Cut Lengths	...	6.45	6.95	7.95	8.75
Coils	...	6.95	7.45	8.45	9.25
Warren,O. R2	...	*6.45*	*6.95*	*7.95*	...
Zanesville,O. A10	...	5.45	5.95	6.70	7.50

COILS AND CUT LENGTHS, Cold-Rolled, Silicon

	Field	Arm.	Elec.	Motor	Dyn.
Warren,O. R2	*6.65*	*6.95*	*7.45*	*8.45*	*9.25*

SHEETS, Silicon Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10	8.05	8.60	9.30	10.10
Brackenridge,Pa. A4 (27)				
Cut Lengths	9.30	9.85	10.55	....
Coils	9.80	10.35	11.05	....
Follansbee,W.Va. F4	9.80	10.35	11.05	11.85
Toronto,O. F4	9.80	10.35	11.05	11.85
Vandergrift,Pa. C3 (27):				
Cut Lengths	9.30	9.85	10.55	11.35
Coils	9.80	10.35	11.05	11.85
Zanesville,O. A10	8.05	8.60	9.30	10.10

COLD-REDUCED COILS and Cut Lengths, Silicon

	72	T-100	T-90	T-80
Butler,Pa. A10	...	12 35	13.60	14.85
Vandergrift,Pa. C3 (27)	...	12.35	13.60	14.85
Warren,O. R2	*9.80*	....	....	....

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10 ....3.50
Cleveland R2 .....*3.95*
Ind.Harbor,Ind. I-2 ....3.50
Warren,O. R2 .....*3.95*

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2 .....*4.70*
Middletown,O. A10 ....4.50
Warren,O. R2 .....*4.70*

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10 ....4.65
Canton,O. R2 .....5.15
Ind.Harbor,Ind. I-2 ....4.95

SHEETS, ZINCGRIP No. 10 Flat, Ingot Iron

Butler,Pa. A10 .....4.90
Middletown,O. A10 ....4.90

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5 .....5.30
Follansbee,W.Va. F4 ..5.30
Gary,Ind. C3 .....5.30
GraniteCity,Ill. G4 ....5.50
Ind.Harbor,Ind. Y1 ....5.30
Irvin,Pa. C3 .....5.30
Niles,O. R2 .....5.30
SparrowsPoint,Md. B2..5.40
Warren,O. R2 .....5.30
Yorkville,O. W10 .....5.30

SHEETS, Enam'lg. Iron, No. 12

Ashland,Ky.(8) A10 ....4.40
Cleveland R2 .....4.40
Ecorse,Mich. G5 .....4.70
Gary,Ind. C3 .....4.40
GraniteCity,Ill. G4 ....4.60
Ind.Harbor,Ind. I-2 ....4.40
Irvin,Pa. C3 .....4.40
Middletown,O. A10 ....4.40
Niles,O. M4 .....4.90
Youngstown Y1 .....4.40

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5 ....$5.75
Fairfield,Ala. T2 .....5.85
Gary,Ind. C3 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1.5.75
Irvin,Pa. C3 .....5.75
Niles,O. R2 .....5.75
Pittsburg,Calif. C11 ....6.50
SparrowsPoint,Md. B2 ..5.85
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.50	$7.75
Fairfield,Ala. T2.	7.60	7.85
Gary C3	7.50	7.75
Gran.City,Ill. G4.	7.70	7.95
Ind.Harb. I-2, Y1	7.50	7.75
Irvin,Pa. C3	7.50	7.75
Pitts.,Cal. C11 ..	8.25	8.50
Sp.Pt.,Md. B2 ..	7.60	7.85
Warren R2	7.50	7.75
Weirton W6	7.50	7.75
Yorkville,O. W10.	7.50	7.75

STRIP, Hot-Rolled Ingot Iron

Ashland.Ky.(8) A10 ....3.50
Warren,O. R2 .....*4.75*

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....4.60

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1 .....3.25
Ashland,Ky.(8) A10 ....3.25
Atlanta A11 .....3.40
Bessemer,Ala. T2 .....3.25
Bridgeprt,Conn.(10) S15.3.25
Butler,Pa. A10 .....3.25
Carnegie,Pa.(9) S18 ....3.50
Conshohocken,Pa. A3 ..3.35
Detroit M1 .....3.45
Ecorse,Mich. G5 .....3.45
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 ....4.40
Gary,Ind. C3 .....3.25
Houston,Tex. S5 .....3.65
Ind.Harbor,Ind. I-2, Y1.3.25
KansasCity,Mo.(9) S5 ..3.85
Lackawanna,N.Y. B2 ..3.25
LosAngeles B3 .....4.00
Milton,Pa. B6 .....3.25
Minnequa,Colo. C10 ....4.30
NewBritain(10) S15 ....3.25
N.Tonawanda,N.Y. B11 .3.30
Pittsburg,Calif. C11 ....4.00
Riverdale,Ill. A1 .....3.25
SanFrancisco S7 .....*3.90*
Seattle B3, N14 .....4.25
Sharon,Pa. S3 .....*3.25*
So.Chicago,Ill. W14 ....3.25
So.SanFrancisco B3 ....4.00
SparrowsPoint,Md. B2 ..3.25
Torrance,Calif. C11 ....4.00
Warren,O. R2 .....3.25
Weirton,W.Va. W6 ....3.25
WestLeechburg,Pa. A4 ..3.25
Youngstown C3 Y1 ....3.25

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15.5.10
Carnegie,Pa. S18 .....5.10
Fontana,Calif. K1 ....6.30
Gary,Ind. C3 .....5.10
Houston,Tex. S5 .....5.50
KansasCity,Mo. S5 ....5.70
NewBritn,Conn.(10) S15.5.10
Sharon,Pa. S3 .....5.10
Youngstown C3 .....5.10

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15.9.50
Carnegie,Pa. S18 .....9.50
Cleveland A7 .....9.50
Dover,O. G6 .....9.50
Harrison,N.J. C18 ....9.80
NewBritn,Conn.(10) S15.9.50
Pawtucket.R.I.(11) N8..9.50
Pawtucket,R.I.(12) N8..9.80
Sharon,Pa. S3 .....9.50
Worcester,Mass. A7 ..9.80
Youngstown C8 .....9.50

STRIP, Cold-Rolled Carbon

Berea,O. C7 .....6.10
Bridgeprt,Conn.(10) S15.4.00
Butler,Pa. A10 .....4.00
Cleveland A7, J5 .....*4.15*
Detroit, D2, D3 .....*4.40*
Detroit M1 .....4.20
Dover,O. G6 .....*4.15*
Ecorse,Mich. G5 .....4.20
Follansbee,W.Va. F4 ...*4.15*
Fontana,Calif. K1 ....4.90
Ind.Harbor,Ind. I-2 ....4.00
Lackawanna,N.Y. B2 ...*4.15*
LosAngeles C1 .....5.00
Mattapan,Mass.(21) T6.4.50
Middletown,O. A10 ....4.00
NewBritain(10) S15 ....4.00
NewCastle,Pa. B4, E5..4.00
NewHaven,Conn. A7, D2 4.65
NewKensington,Pa. A6..4.00
NewYork W3 .....5.00
Pawtucket,R.I.(11) N8..4.55
Pawtucket,R.I.(21) N8..4.50
Pawtucket,R.I. R3 ....4.50
Riverdale,Ill. A1 .....*4.30*
Sharon,Pa. S3 .....*4.15*
SparrowsPoint,Md. B2 ...*4.15*
Trenton,N.J.(13) R5 ..5.00
Wallingford.Conn. W2 ..4.50
Warren,O. T5 .....4.00
Warren,O. R2 .....*4.15*
Weirton,W.Va. W6 .....*4.15*
Youngstown Y1 .....*4.15*
Youngstown C8 .....4.00

STRIP, Cold-rolled, High-Strength Low-Alloy

Cleveland A7, J5 .....*6.20*
Dover,O. G6 .....6.05
Ecorse,Mich. G5 .....6.25
Fontana,Calif. K1 ....6.95
Lackawanna,N.Y. B2 ...6.05
Sharon,Pa. S3 .....*6.30*
SparrowsPoint,Md. B2 ..6.05
Warren,O. R2 .....*6.20*
Weirton,W.Va. W6 .....*6.20*
Youngstown Y1 .....6.05

STRIP, Electro Galvanized

Weirton,W.Va. W6 .....*4.15*
Youngstown C8 .....4.00

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40C	0.40-0.60C	0.60-0.80C	0.80-1.05C	1.05-1.35C
Bridgeprt,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.50	6.10	8.05	10.35
Chicago T6	4.25	5.65	6.25	8.20	10.50
Cleveland A7	4.00	5.50	6.10	8.05	10.35
Dover,O. G6	4.00	5.50	6.10	7.85	10.15
Harrison,N.J. C18	...	...	6.40	8.35	10.65
Mattapan,Mass. T6	4.50	5.80	6.40	8.35	10.65
NewBritn.,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
NewCastle,Pa. B4	4.00	5.50	6.10	8.05	....
NewCastle,Pa. E5	4.00	5.50	6.10	8.05	10.35
NewYork W3	...	5.80	6.40	8.35	10.65
Pawtucket,R.I. N8					
Cleve.orPitts.Base	4.55	5.50	6.10	8.05	10.35
Worcester,Mass.Base	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.00	5.50	6.10	8.05	10.35
Trenton,N.J. R5	...	6.30	6.90	8.85	11.15
Union,N.J. H6	4.40	6.35	6.35	8.30	10.50
Wallingford,Conn. W2	4.50	5.80	6.40	8.05	10.35
Weirton,W.Va. W6	4.00	5.50	6.10	8.05	10.35
Worcester,Mass. A7	4.30	5.80	6.40	8.35	10.65
Worcester,Mass. T6	4.50	5.80	6.40	8.35	10.65
Youngstown C8	4.50	5.50	6.10	8.05	10.35

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold-Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cld.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Col. Steel & Shafting Co.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Co.
D4 Disston & Sons,Henry
D6 Driver Harris Co.

E1 Eastrn.Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Co.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.
H6 Hind Steel Co. Inc.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2 .....4.95
Conshohocken,Pa. A3 ..4.95
Ecorse,Mich. G5 .....5.15
Fairfield,Ala. T2 .....4.95
Fontana,Cal. K1 .....6.64
Gary,Ind. C3 .....4.95
Ind.Harb.,Ind. I-2, Y1 ..4.95
Lackawanna,N.Y. B2 ...4.95
Sharon,Pa. S3 .....4.95
SparrowsPoint,Md. B2 ..4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 .....4.95
Youngstown C3, Y1 ....4.95

TIGHT COOPERAGE HOOP

Atlanta A11 .....3.60
Riverdale,Ill. A1 .....3.60
Sharon,Pa. S3 .....3.60
Youngstown C3 .....3.60

WIRE, Cold-Rolled Flat

Chicago T6 .....5.35
Cleveland A7 .....5.35
Dover,O. G6 .....5.15
Fostoria,O. S1 .....5.50
Kokomo,Ind. C16 .....5.00
Massillon,O. R8 .....5.00
Monessen,Pa. P7 .....5.00
Pawtucket,R.I.(11) N8..5.55
Pawtucket,R.I.(12) N8..5.50
Trenton,N.J. R5 .....5.80
Worcester,Mass. A7 .....5.65
Worcester,Mass. T6 ....5.30

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(19) K4 ..7.70
Buffalo W12 .....7.70
Chicago W13 .....7.70
Cleveland A7 .....8.05
Fostoria,O. S1 .....8.20
Johnstown,Pa. B2 .....7.70
Kokomo,Ind. C16 .....7.70
Palmer,Mass. W12 .....8.00
Portsmouth,O. P12 .....7.70
Trenton,N.J. R5 .....8.50
Waukegan,Ill. A7 .....8.05
Worcester,Mass. T6 ....8.00
Worcester,Mass. A7 .....8.35

WIRE (16 gage)	An'ld. Galv. Stone	An'ld. Galv. Stone
Aliquippa J5	9.05	10.55
Bartnvill(19) K4.	9.05	10.55
*Cleveland A7	9.40	10.90*
Fostoria,O. S1 ...	9.65	11.15
Johnstown B2 ...	9.05	10.55
Kokomo C16	9.05	10.55
Minnequa C10 ...	9.40	10.90
Palmer,Mass. W12	9.35	10.85
*Pitts.,Cal. C11 ..	9.75	11.25*
Prtsmth.(18) P12.	9.05	10.55
SparrowsPt. B2 .	9.15	10.65
*Waukegan A7	9.40	10.90*

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity, Ala. R2 ..4.50
Aliquippa,Pa. J5 .....4.50
Alton,Ill.(1) L1 .....4.15
Bartonville,Ill.(1) K4 ...4.15
Buffalo W12 .....4.15
Chicago W13 .....4.15
Cleveland C20 .....4.15
Cleveland A7 .....4.50
Crawfrdsvll,Ind. M8 ....4.30
Donora,Pa. A7 .....4.50
Duluth A7 .....4.50
Fairfield,Ala. T2 .....4.50
Fostoria,O.(24) S1 .....4.65
Houston S5 .....4.55
Johnstown,Pa. B2 .....4.15
Joliet,Ill. A7 .....4.50
KansasCity,Mo. S5 .....4.75
Kokomo,Ind. C16 .....4.25
LosAngeles B3 .....5.10
Minnequa,Colo. C10 ....4.50
Monessen,Pa. P7 .....4.50
Newark,6-8ga. I-1 .....4.75
No.Tonawanda B11 ....4.18
Palmer,Mass. W12 .....4.45
Pittsburg,Calif. C11 ....5.45
Portsmouth,O. P12 .....4.15
Rankin,Pa. A7 .....4.50
So.Chicago,Ill. R2 .....4.50
So.SanFrancisco C10 ...5.10
SparrowsPoint,Md. B2 ..4.25
Sterling,Ill.(1) N15 .....4.15
Struthers,O. Y1 .....4.50
Torrance,Calif. C11 .....5.45
Waukegan,Ill. A7 .....4.50
Worcester,Mass. T6 ....4.45
Worcester,Mass. A7 ....4.80

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....5.90
Alton,Ill.(1) L1 .....5.55
Bartonville,Ill.(19) K4 ..5.55
Buffalo W12 .....5.55
Cleveland A7 .....5.55
Donora,Pa. A7 .....5.55
Duluth A7 .....5.55
Fostoria,O. S1 .....6.05
Johnstown,Pa. B2 .....5.55
LosAngeles B3 .....6.50
Milbury,Mass.(12) N6 ..5.85
Monessen,Pa. P7 .....5.90
Palmer,Mass. W12 .....5.85
Pittsburg,Calif. C11 ....6.85
Portsmouth,O. P12 .....5.55
So.Chicago,Ill. R2 .....5.90
SparrowsPoint,Md. B2 ..5.65
Struthers,O. Y1 .....5.90
Trenton,N.J. A7 .....5.85
Trenton,N.J. R5 .....6.35
Waukegan,Ill. A7 .....5.55
Worcester A7,J4,T6,W12.5.85

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	7.10	7.40	7.80
Buffalo W12	7.50	7.80	8.20
Cleveland A7	7.50	7.80	8.20
Donora,Pa. A7	7.50	7.80	8.20
Fostoria,O. S1	8.00	8.30	8.70
Johnstown,Pa. B2	7.50	7.80	8.20
Monessen,Pa. P7	7.50	7.80	8.20
NewHaven,Conn. A7	7.80	8.10	8.50
Palmer,Mass. W12	7.80	8.10	8.50
Portsmouth,O. P12	7.50	7.80	8.20
SparrowsPoint,Md. B2	7.60	7.90	8.30
Struthers,O. Y1	7.50	7.80	8.20
Trenton,N.J. A7	7.80	8.10	8.50
Trenton,N.J. R5	8.00	8.30	8.70
Waukegan,Ill. A7	7.50	7.80	8.20
Williamsport,Pa. B2	7.60	7.90	8.30
Worcester,Mass. J4	7.70	8.10	8.50

WIRE, Merchant Quality

(6 to 8 gage)	An'ld.	Galv.
*Ala.City, K2	5.15	5.60*
*Aliquippa J5	5.35	5.60*
Atlanta A11	4.90	5.35
Bartnville.(19) K4	4.80	5.25
Buffalo W12	4.80	...
*Cleveland A7	5.15	5.60*
*Donora A7	5.15	5.60*
*Duluth A7	5.15	5.60*
*Fairfield T2	5.15	5.60*
Crawfrdvll. M8 ..	4.95	5.40
Houston,Tex. S5.	5.20	5.65
Johnstown B2 ...	4.80	5.25
*Joliet,Ill. A7	5.15	5.60*
KansasCity,Mo. S5	5.40	5.85
Kokomo C16	4.90	5.35
LosAngeles B3 ..	5.75	...
Minnequa C10 ...	5.15	5.60
*Monessen P7	5.15	5.60*
Palmer,Mass W12	5.10	...
*Pitts.,Cal. C11 ..	6.10	6.55*
Portsmth.(18) P12	4.80	5.25
*Rankin A7	5.15	5.60*
*So.Chicago R2	5.15	5.60*
So.S.Fran. C10 ..	5.75	6.20
SparrowsPt. B2 .	4.90	5.35
Sterling,Ill.(1)N15	4.80	5.25
*Struthers,O. Y1 ..	5.35	5.60*
*Torrance,Cal. C11	6.10	...*
*Worcester A7	5.45	5.90*

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....5.55
Alton,Ill.(1) L1 .....5.20
Buffalo W12 .....5.20
Cleveland A7 .....5.55
Donora,Pa. A7 .....5.55
Duluth A7 .....5.55
Johnstown,Pa. B2 .....5.20
LosAngeles B3 .....6.15
Monessen P7 .....5.55
NewHaven,Conn. A7 ....5.85
Palmer,Mass. W12 .....5.50
Pittsburg,Calif. C11 ....6.50
Portsmouth,O. P12 .....5.20
So.Chicago,Ill. R2 .....5.55
SparrowsPoint,Md. B2 ..5.30
Struthers,O. Y1 .....5.55
Torrance,Calif. C11 ....6.50
Trenton,N.J. A7 .....5.85
Waukegan,Ill. A7 .....5.55
Worcester,Mass. A7 ....5.85

WIRE, Barbed	Col.
AlabamaCity,Ala. R2 ...	*126*
Aliquippa,Pa. J5	*126*
Atlanta A11	125
Bartonville,Ill.(19) K4 ..	123
Crawfordsville M8	126
Donora,Pa. A7	*126*
Duluth,Minn. A7	*126*
Fairfield,Ala. T2	*126*
Houston,Tex. S5	131
Johnstown,Pa. B2	123
Joliet,Ill. A7	*126*
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	130
Monessen,Pa. P7	*126*
Pittsburg,Calif. C11	*146*
Portsmouth,O.(18) P12...	123
Rankin,Pa. A7	*126*
So.Chicago,Ill. R2	*126*
So.SanFran.,Calif. C10...	143
SparrowsPoint,Md. B2 ..	125
Sterling,Ill.(1) N15	123

FENCE POSTS	Col.
Duluth A7	112
Huntington,W.Va. W7 ..	112
Johnstown,Pa. B2	112
Joliet,Ill. A7	112
Minnequa,Colo. C10	120
Moline,Ill. R2	116
Williamspt,Pa. S19...n.t.	$120

WOVEN FENCE, 9-15½ gage

	Col.
Ala.City,Ala.,17-18ga. R2 .191	
AlabamaCity,Ala. R2 116	
Aliquib.,Pa.9-14½ga. J5. .116	
Atlanta A11 111	
Bartonville,Ill.(19) K4 ..109	
Crawfordsvll,Ind. M8 ...112	
Donora,Pa. A7 116	
Duluth A7 116	
Houston,Tex. S5 117	
Fairfield,Ala. T2 116	
Johnstown,Pa. B2 109	
Johnstn,17ga.,6" B2 183	
Johnstn,17ga.4" B2 186	
Joliet,Ill. A7 116	
KansasCity,Mo. S5 121	
Kokomo,Ind. C16 111	
Minnequa,Colo. C10 116	
Monessen,Pa. P7 116	
Pittsburg,Calif. C11 139	
Portsmouth,O.(18) P12..109	
Rankin,Pa. A7 116	
So.Chicago,Ill. R2 116	
Sterling,Ill.(1) N15 109	

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2 113	
Atlanta A11 107	
Bartonville,Ill.(19) K4 ..106	
Chicago W13 106	
Crawfordsville M8 109	
Donora,Pa. A7 113	
Duluth A7 113	
Fairfield,Ala. T2 113	
Joliet,Ill. A7 113	
Kokomo,Ind. C16 108	
Minnequa,Colo. C10 113	
Pittsburg,Calif. C11 137	
Portsmouth,O.(18) P12 .106	
So.Chicago,Ill. R2 113	
So.SanFran., Calif. C10..130	
SparrowsPoint,Md. B2 ..108	
Sterling,Ill.(1) N15 106	

NAILS & STAPLES, Stock To Dealers & Mfrs. (7)

AlabamaCity,Ala. R2 106
Aliquippa,Pa. J5 106
Atlanta A11 105
Bartonville,Ill.(19) K4 ..103
Chicago,Ill. W13 103
Cleveland A9 112
Crawfordsville M8 106
Donora,Pa. A7 106
Duluth A7 106
Fairfield,Ala. T2 106
Houston,Tex. S5 111
Johnstown,Pa. B2 103
Joliet,Ill. A7 106
KansasCity,Mo. S5 115
Kokomo,Ind. C16 105
Minnequa,Colo. C10 110
Monessen,Pa. P7 106
Pittsburg,Calif. C11 125
Portsmouth,O. P12 103
Rankin,Pa. A7 106
So.Chicago,Ill. R2 106
SparrowsPoint,Md. B2 ..105
Sterling,Ill.(1) N15 103
Torrance,Calif. C11 126
Worcester,Mass. A7 112

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2 ...5.35
Bartonville,Ill.(19) K4 ..5.20
Donora,Pa. A7 .....5.35
Duluth A7 .....5.35
Johnstown,Pa. B2 .....5.20
Joliet,Ill. A7 .....5.35
Kokomo,Ind. C16 .....5.30
Minnequa,Colo. C10 ....5.55
Pittsburg,Calif. C11 ....6.30
Portsmouth.O. P12 ....5.20
Rankin,Pa. A7 .....5.35
So.Chicago,Ill. R2 .....5.35
SparrowsPoint,Md. B2...5.30
Worcester,Mass. A7 .....5.65

NAILS, Cut (100 lb keg)

Conshohocken,Pa. A3 ..$6.75
Wheeling,W.Va. W10 ...6.75

AXLES

Fairfield,Ala. T2 .....5.25
Gary,Ind. C3 .....5.25
Ind.Harbor,Ind. S13 ....5.20
Johnstown,Pa. B2 .....5.20
McKeesRocks,Pa. C3 ....5.25

TIE PLATES

Fairfield,Ala. T2 .....4.20
Gary,Ind. C3 .....4.20
Ind.Harbor,Ind. I-2 ....4.05
Lackawanna,N.Y. B2 ....4.20
Minnequa,Colo. C10 ....4.05
Pittsburg,Calif. C11 ....4.35
Pittsburgh R2 .....4.20
Seattle B3 .....4.50
Steelton,Pa. B2 .....4.20
Torrance,Calif. C11 ....4.35
Weirton,W.Va. W6 .....4.05

JOINT BARS

Bessemer,Pa. C3 .....4.40
Fairfield,Ala. T2 .....4.40
Ind.Harbor,Ind. I-2 .....4.25
Joliet,Ill. C3 .....4.40
Lackawanna,N.Y. B2 ....4.40
Minnequa,Colo. C10 ....4.25
Steelton,Pa. B2 .....4.40

TRACK BOLTS (20)Treated

Fairfield,Ala. T2 .....8.50
Lebanon,Pa. B2 .....8.50
Minnequa,Colo. C10 ....8.25
Pittsburgh,Pa. O3, P14 .8.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2 .....5.35
Ind.Harbor,Ind. I-2, Y1 .5.35
Kansas City, Mo. S5 ...5.60
Lebanon,Pa. B2 .....5.35
Minnequa,Colo. C10 ....5.35
Pittsburgh J5 .....5.35
So.Chicago,Ill. R2 .....5.35
Struthers,O. Y1 .....5.35
Youngstown R2 .....5.35

LIGHT RAILS, Rail Steel

Huntington,W.Va. W7 ..3.55
Williamsport,Pa. S19 ...3.55

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb. Under
*Bessemer,Pa. C3	3.40	3.30	3.35	3.75*
*Ensley,Ala. T2	3.40	3.30	...	3.75*
*Fairfield,Ala. T2	...	...	...	3.75*
*Gary,Ind. C3	3.40	3.30	3.35	...*
Ind.Harbor,Ind. I-2	3.20	3.10	3.15	...
*Johnstown,Pa. B2	...	...	...(16)	3.75*
*Lackawanna B2	3.40	3.30	...	3.75*
Minnequa,Colo. C10	3.20	3.10	...	4.25
*Steelton,Pa. B2	3.40	3.30		

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng High Carb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S7 Simmonds Co.
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U4 Universal Cyclops Steel
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Corp.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn. Auto. Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Co.
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstwn. Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	19.00	18W,4Cr,3V	114.50
Extra Carbon	22.00	18W,4Cr,2V,9Co	168.50
Spec. Carbon	26.50	18W,4Cr,2V,6Co	154.00
Oil Hardening	29.00	18.25W,4.25Cr,1V,4.75Co	142.00
Hi-Carbon-Cr	52.00	20.25W,4.25Cr,.1.6V,12.25Co	266.50
Cr Hot Wrk.	29.00	1.5W,4Cr,1V,8.5Mo	65.00
18W,4Cr,1V	90.50	6.4W,4.5Cr,1.9V,5Mo	69.50
18W,4Cr,2V	102.50	6W,4Cr,3V,6Mo	88.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated
(21) New Haven, Conn. Base.
(14) Also wide flange beams.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c.
(27) 22 Gage; hot or cold-reduced.
(28) Bonderized.

STANDARD PIPE, T. & C.

(Listed discounts are subject to revision, pending announcement of current changes being effected. Announcements issued to date indicate new discounts will be 2½ points lower.)

BUTTWELD

Size	List	Pounds	Carload Discounts from List, % —Black—			—Galvanized—		
Inches	Per Ft	Per Ft	A	B	C	D	E	F
⅛	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5
¼	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5
⅜	6.0	0.57	36	34	33	12.5	10.5	9.5
½	8.5	0.85	43	41	42	26.5	24.5	25.5
¾	11.5	1.13	46	44	45	30.5	28.5	29.5
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5
1¼	23.0	2.28	49	47	48	34	32	33
1½	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5
2	37.0	3.68	50	48	49	35	33	34
2½	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10; Wheatland, Pa., 2 points lower on ⅛ through ⅜", W9. Following make ½ through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3" continuous weld.

Columns B & E: Sparrows Point Md. B2; Wheatland, Pa., ⅛" through ⅜", W9.

Columns C & F: Alton, Ill. (Lorain, O. base) L1; Indiana Harbor, Ind., ½" through 3", Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10; Wheatland, Pa., except 2 pts lower on ⅛" through ⅜" W9. Following make ½" through 3" only: Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3" continuous weld.

SEAMLESS AND ELECTRIC WELD

Size	List	Pounds	Carload Discounts from List, % Seamless		Elec. Weld	
Inches	Per Ft	Per Ft	Black A	Galv. B	Black C	Galv. D
2	37.0c	3.68	38.5	23	38.5	23
2½	58.5	5.82	41.5	26	41.5	26
3	76.5	7.62	41.5	26	41.5	26
3½	92.0	9.20	43.5	28	43.5	28
4	$1.09	10.89	43.5	28	43.5	28
5	1.48	14.81	43.5	28	43.5	28
6	1.92	19.18	43.5	28	43.5	28

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 4 to 24 ft, inclusive.

O.D.	B.W.	—Seamless—		Elec. Weld	
In.	Ga.	H.R.	C.D.	H.R.	C.D.
1	13	12.36	14.39	13.00	13.00
1¼	13	14.63	17.05	13.21	15.39
1½	13	16.17	19.02	14.60	17.18
1¾	13	18.39	21.64	16.60	19.54
2	13	20.61	24.24	18.60	21.89
2¼	13	22.96	27.03	20.73	24.40
2¼	12	25.29	29.76	22.83	26.88
2½	12	27.71	32.58	25.02	29.41
2¾	12	29.36	34.53	26.51	31.18
3	12	30.82	36.27	27.82	32.74
3¼	11	35.87	42.22	32.39	38.11
3½	11	38.52	45.35	34.78	40.94
4	10	47.82	56.25	43.17	50.78
4½	9	63.37	74.59	....	....
5	9	73.37	86.32	....	....
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pacific Tube Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding	—Plates— Carbon Base		—Strip— Cold-Rolled Carbon Base		—Sheets— Carbon Base		Copper Base
Stainless	10%	20%	10% Both Sides		10%	20%	Both Sides
302	....	....	....	....	19.75	21.50–	75.00
304	22.50	26.50	....	....	20.75	22.50–	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00–	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00–	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Deoxidized. † Deduct 4.25c for hot-rolled. Production for carbon base products are: Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

(To consumers)

F.o.b. midwestern plants. Additional discounts on carriage, machine bolts, 5 for cl; 15 for full containers, except tire and plow bolts.

CARRIAGE, MACHINE BOLTS

(Per cent off list)

½-in., smaller; up to 6 in. long 35
⅝ & ⅝ x 6 in., shorter. 37
¾-in. & larger x 6 in., shorter 34
All diameters longer than 6-in. 30
Tire bolts 25
Plow bolts 47
Lag bolts, 6 in., shorter 37
Lag bolts, longer than 6 in. 35

NUTS

Semifinished hexagon	A.S. Light	Reg. & Heavy
⅞-in., smaller	41 off	....
½-in., smaller	....	38 off
½-in.-1-in.	39 off	....
⅝-in.-1-in.	....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in., larger	34 off	28 off

Additional discount of 15 for full containers.

STOVE BOLTS

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

SQUARE HEAD SET SCREWS

Upset 1-in. & smaller 51 off
¾, ⅞, & 1 x 6-in. & shorter ..... 35 off
Headless, ¼-in., larger 31 off

HEXAGON CAP SCREWS

(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright) ..... 46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter ..... 40 off

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 6.75c
⅝-in., under ..... 48 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

—Inches— Diam.	Length	Cents per lb.
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4,5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge, Pa., sheets A4.
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk, N. Y., bars, wire A4.
Duquesne, Pa., bars C3.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4.
So. Chicago, Ind., bars & structurals C3.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 309 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 22.00
Toluol, one deg. 19.00-24.75
Industrial xylol 20.50-26.50

Per ton bulk, ovens
Sulphate of ammonia..$45.00

Per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.25
Do., less than carlots..14.00
Do., tank cars 12.50

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

Cents

Sponge Iron:
98+% Fe, carlots... 15.00
Swedish, c.i.f. New York, in bags..7.40-8.50
Electrolytic Iron:
Annealed, 99.5% Fe. 39.50
Unannealed, 99+% Fe 33.50
Unannealed, 99+% Fe (minus 325 mesh) 48.50
Carbonyl Iron:
97.9-99.8%, size 5 to 10 microns..65.00-130.00
Aluminum:
Carlots, freight allowed 27.00
Atomized, 500-lb drums, freight allowed 30.00
Brass, 10-ton lots.23.25-26.25
Copper:
Electrolytic 27.75
Reduced 27.00
Lead 18.50
Manganese:
Minus 100-mesh 52.00-55.00
Minus 35 mesh..... 48.00
Minus 200 mesh..... 56.00
Nickel, unannealed61.00-66.00
Silicon 34.00-40.00
Solder (plus cost of metal) 8.50
Stainless Steel, 302... 75.00
Tin 90.00-90.75
Zinc, 10-ton lots..15.50-18.25

Dollars

Tungsten:
99%, minus 80 to 200 mesh, freight allowed, 1000 lb and over .. 2.90
500 to 1000 lb 2.95
less than 500 lb ... 3.05
98.8%, minus 65 mesh, freight allowed, 1000 lb and over .. 2.90
less than 1000 lb .. 3.05
Molybdenum:
99%, minus 80 to 200 mesh, over 500 lb 2.25
200 to 500 lb 2.50
less than 200 lb .. 2.75
82-88%, freight allowed, 2000 lb and over .. 2.40
less than 2000 lb .. 2.45
Chromium, electrolytic, 99% Cr min. 3.50

METALLURGICAL COKE

Price per Net Ton

BEEHIVE OVENS

Connellsvll, fur. $13.00-13.50
Connellsvll, fdry..15.00-16.00
New River, foundry....18.00
Wise county, foundry..15.35
Wise county, furnace..14.60

OVEN FOUNDRY COKE

Kearny, N. J., ovens.$22.00
Everett, Mass., ovens .. New England, del.‡..22.70
Chicago, ovens 20.00
Chicago, del. .....†21.45
Detroit, del. 23.91
Terre Haute, ovens....20.20
Milwaukee, ovens 20.75
Indianapolis, ovens 19.85
Chicago, del. 23.32
Cincinnati, del. 22.77
Detroit, del. 23.75
Ironton, O., ovens 19.40
Cincinnati, del. 21.63
Painesville, O., ovens..20.90
Buffalo, del. 23.02
Cleveland, del. 22.62
Erie, del. 21.04
Birmingham, ovens 17.70
Philadelphia, ovens 20.45
Swedeland, Pa., ovens.20.40
Portsmouth, O., ovens.19.50
Detroit, ovens 20.65
Detroit, del. *21.70
Buffalo, del. 22.95
Flint, del. 23.00
Pontiac, del. 21.98
Saginaw, del. 23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.03 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS				PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§	Standard Structural Shapes	Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city) ..	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try .	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)...	5.90	6.49	6.88	5.65	...	5.65	6.21	8.10	5.35	5.60	6.80
Phila. (c'try)..	5.65	6.24	6.63	5.40	...	5.40	5.96	7.85	5.10	5.35	6.55
Balt. (city) ..	5.46	6.36	6.81	5.52	...	5.57	6.05	...	5.51	5.71	7.16
Balt. (c'try) ..	5.31	6.21	6.66	5.37	...	5.42	5.91	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (W'hse)..	4.85	5.75[4]*	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse).	5.32	6.22[4]*	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse) .	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.27‡	5.94**	6.83	5.39	6.10	5.44	5.95	...	5.44	5.64	7.05
Chicago (city)...	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[5]	5.10	5.30	6.75
Chicago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee(city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.03[5]	5.23	5.43	6.88
Milwau. (c'try).	5.03	5.93[4]	7.03	5.03	6.33-6.83	5.08	5.63	7.88[5]	5.08	5.28	6.73
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
St. L. (w'hse).	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.05	6.59	...	5.05	5.25	7.74
Birm'ham(c'try)	4.85	5.75	6.40	4.85	...	4.90	...	...	4.90	5.10	...
Omaha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	5.60	7.15	7.60	6.10	7.75	5.75	7.40	...	5.60	5.65	7.90
L. A. (w'hse)..	5.45	7.00	7.45	5.95	7.60	5.60	7.25	...	5.45	5.50	7.75
San Francisco..	6.15[10]	7.50[3]	7.80	6.75[10]	8.25[3]	5.90[10]	7.55	10.85[2]	5.90	6.35	8.10
Seattle-Tacoma.	6.70[7]‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.10	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; ** 17 gage; †† as annealed. Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa. $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

LADLE BRICK

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., Otawa, Ill., $90; Beach Creek, Pa., $80.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅝" grains; Bulk, $30.50-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Bellmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	18.50

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-$22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid. 81.8c-83.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$35.00
48% 3:1	37.50
48% no ratio	28.50-29.00

South African Transvaal

44% no ratio	$19.00-20.00
45% no ratio	19.50-21.00
48% no ratio	27.00-28.00
50% no ratio	28.50-29.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	28.00-29.00
48% 3:1 lump	37.50

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolitic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c, 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

Chromium Alloys

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 104)

Spot Tin Drops to 78-Cent Level

Market is at lowest level since March, 1947, and is 32 per cent under the August price. Increase of $2 on premium for high grade zinc is first change in nearly 20 years.

New York—Since Nov. 21, the only price movement in major nonferrous metal markets has been the steady decline in tin. Grade A tin is available for prompt delivery at 78.00c, New York, while futures are quoted down to around 74.12½c for March arrival. Copper, lead and zinc have been stabilized, temporarily at least, at the 18.50, 11.80 and 9.75-cent respective levels. However, the premium on high grade zinc has been increased $2 a ton, the first change in nearly 20 years.

Usual yearend factors have exerted their influence in keeping sales light. Consumers are either drawing on their inventories to reduce them as much as possible before the Dec. 31 accounting date, or are buying only enough to maintain stocks at present levels.

Tin—Only small tonnages of tin are moving at the 78-cent level, which represents a drop of 32 per cent from the price quoted through August of this year. The market is now quoted at the lowest level since March, 1947. Small quantities of Grade A metal have been booked as low as 74.50c for February delivery and 74.12½c for March delivery. The sharp reduction in prices for futures is attributed to weakness in the Far East.

Tin Sales Corp., selling agency for the Reconstruction Finance Corp., reduced its prices to the basis of 78.00c for Grade A tin, effective Dec. 22.

November exports of tin concentrates in terms of fine tin from Bolivia totaled 3701 tons, including 60 tons of tin metal from the Oruro smelter. This brought the 11 months' total to 29,994 tons compared with 33,445 tons in the like 1948 period and 29,290 tons in 1947.

Copper—Deliveries of copper in December are expected to show an increase over the 118,146 tons reported in November. This would be a new high since September, 1948, when the movement amounted to about 123,000 tons. Demand is reported satisfactory for January delivery, although pressure for coverage has tapered somewhat as the holiday lull approaches.

There were 108,978 tons of new refined copper used in products shipped in November from the plants of brass mills, wire mills and foundries. This was 2050 tons more than was used in October.

Manufacturers of copper and copper alloy products experienced a substantial pick up in new business booked last month. It is estimated that new orders taken in November will require 117,232 tons of refined copper against 101,467 tons for October.

There were 119,611 tons of refined copper received by the makers of copper products last month. This exceeded the amount used in shipments, resulting in an addition of 10,297 to manufacturers' stocks which aggregated 328,551 tons at the end of November.

Copper needs of brass mills, wire mills and foundries at the end of November were estimated at 464,513 tons. To meet these requirements, they had copper on hand or to be delivered amounting to 416,862 tons (328,551 tons in stock and 88,311 tons to be delivered). This left an apparent deficit of 48,399 tons. At the end of October, the apparent deficit was 57,409 tons.

Lead — Including tonnages earmarked for the government's permanent stockpile, the amount of lead sold for delivery this month exceeds the November total. October shipments amounted to 23,738 tons.

Shipments of automotive replacement batteries in November, although showing a decline from the preceding month, were in excess of 2 million units, reports the Association of American Battery Manufacturers Inc. Shipments in November totaled 2,129,000 units compared with 2,573,000 in October and 2,539,000 in November, 1948. Total shipments during the first 11 months of this year amounted to 16,647,000 units, or 5,169,000 less than in the comparable period last year. Shipments this month are expected to drop below 2 million, since the current sales rate of replacement batteries is not encouraging.

Zinc—Stringency in supplies of high grade and special high grade zinc has increased. No further supplies of these grades are available for sale at a premium of 1-cent a pound over the 9.75c, East St. Louis, base for prime western. Premiums now quoted are 1.10 cents for high grade and 1.25 cents for special high grade, making the respective markets 10.85c and 11.00c, delivered. Concurrently the price of die casting alloy has advanced ¼-cent to the basis of 13.75c, delivered, for carlots.

No other new developments were noted, business in prime western being restricted to routine buying of carlots.

Aluminum Production Declines

Washington — Output of primary aluminum in the United States declined to 45,790 net tons in October from 49,742 tons in September and compared with 54,526 tons in October, 1948, reports the Bureau of Mines. Although the Reynolds Metals Co. resumed production on two of the potlines at Jones Mills, Ark., a strike by the United Steelworkers-CIO on Oct. 17, at the Alcoa, Tenn., and Badin, N. C., plants of the Aluminum Co. of America reduced the national output to the lowest level since February, 1948.

Increased sales during October reduced the abnormally high inventories to 46,607 tons from 53,597 tons at the end of September. At the end of April, stocks had totaled only 11,746 tons.

Shipments amounted to 52,780 tons in October compared with 44,552 tons in the preceding month and 57,403 tons in August, the peak month for the year to date.

Net imports of aluminum totaled 3379 tons in October, as shipments of crude from Canada increased to about the monthly average for 1949. Receipts in semicrude form from the United Kingdom also showed a large gain. Decreased shipments of ingots, slabs and crude to Germany and sheets, plates and strip to Venezuela contributed most to the decline in total exports. Gains were noted in shipments of crude to Italy and semicrude to Indonesia.

Imports of metal and alloys, crude totaled 5458 tons, making the total for the first 10 months 56,206 tons; those of plates, sheets, bars, etc. totaled 465 tons in October, making the total 8142 tons. Exports of ingots, slabs, and crude totaled 342 tons in October, making the total for the first 10 months 7928 tons; of plates, sheets, bars, etc., 2202 tons, making the total for the first 10 months 26,665 tons.

Nickel Use Dips 15 Per Cent

Copper Cliff, Ont.—Total world consumption of Canadian nickel in all forms in 1949 is expected to be about 15 per cent lower than in 1948, when a new high peacetime record was established, Robert C. Stanley, chairman, International Nickel Co. of Canada Ltd., says in this annual review of the nickel industry. He also forecasts that consumption will be well maintained during 1950, because of the broad diversification of uses of nickel and its alloys in the industrial world and the wide range of their properties.

Aluminum, Magnesium Products

Washington—Average daily shipments of aluminum wrought products during October were 11 per cent above September, 1949 but 23 per cent below October, 1948, reports Bureau of the Census. Shipments of magnesium wrought products during October, also on an average working-day basis, were 10 per cent greater than in September, 1949, and 53 per cent greater than in October of last year.

Net shipments of aluminum wrought products totaled 106 million pounds in October as compared with 96 million pounds in September, 1949, and 139 million pounds in October, 1948. The increase over September was principally due to an 11 million pound increase in shipments of plate, sheet, and strip.

Net shipments of the magnesium wrought products covered by the Bureau of the Census totaled 793 thousand pounds in October, 724 thousand pounds in September, 1949, and 519 thousand pounds in October, 1948.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 18.50c, Conn. Valley, Lake, 18.62½c, Conn. Valley.
Brass Ingot: 85-5-5-5 (No. 115) 16.75-18.25c; 88-10-2 (No. 215) 25.25c; 80-10-10 (No. 305) 21.75c; No. 1 yellow (No. 405) 14.25-16.00c.
Zinc: Prime western 9.75c, brass special 10.00c, intermediate 10.25c, East St. Louis; high grade 10.75-10.85c, delivered.
Lead: Common 11.80c; chemical, 11.90c; corroding, 11.90c, St. Louis.
Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.
Secondary Aluminum: Piston alloys 16.50-17.00c; No. 12 foundry alloy (No. 2 grade) 16.25-16.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00-18.25c; grade 2, 17.50-17.75c; grade 3, 16.00-16.25c; grade 4, 15.50-15.75c. Prices include freight at carload rate up to 75 cents per 100 lb.
5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.
Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.
Tin: Grade A, prompt delivery, 78.00c; January arrival, 75.75c; February arrival, 74.75c; March arrival, 74.25c. Chinese, 99% tin, prompt del., nom.

RFC selling prices for prompt delivery, ex-dock New York or f.o.b. Texas City, Tex.: Grade A, 99.8% or higher (including Straits) 78.25c.
Antimony: American 99-99.8% and over but not meeting specifications below, 32.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 32.50c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99% (Chinese, English, Belgium), prompt, 26.00c, New York.
Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.
Mercury: Open market, spot, New York $71-$74 per 76-lb flask.
Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.
Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.
Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.
Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York, 73.25c per oz.
Platinum: $69-72 per ounce.
Palladium: $24 per troy ounce.
Iridium: $100-$110 per troy ounce.
Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

Sheet: Copper 32.18; yellow brass 28.69; commercial bronze, 95% 32.10; 90%, 31.61; red brass, 85%, 30.60; 80%, 30.12; best quality, 29.58; nickel silver, 18%, 42.27; phosphor-bronze, grade A, 5% 50.90.
Rods: Copper, hot-rolled 28.03; cold-drawn 29.28; yellow brass free cutting, 23.19; commercial bronze, 95% 31.79; 90% 31.30; red brass 85% 30.29; 80% 29.81.
Seamless Tubing: Copper 32.22; yellow brass 31.70; commercial bronze 90% 34.27; red brass 85% 33.51; 80% 33.03.
Wire: Yellow brass 28.98; commercial bronze, 95% 32.39; 90% 31.90; red brass, 85% 30.89; 80% 30.41; best quality brass 29.87.
Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 22.55, l.c.l. 23.17, c.l. 22.67; weatherproof, f.o.b. eastern mills, 100,000 lb lots 24.85, l.c.l. 25.60, c.l. 25.10; magnet, delivered, c.l. 28.50, 15,000 lb or more 28.75, l.c.l. 29.25.

ALUMINUM

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	**48.0**	...	...
0.156-0.203	**41.0**	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	36.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List price plus 45%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. 19-22	18.50	11.80	9.75	78.00	17.00	32.00	40.00	73.25
Dec. 16-17	18.50	11.80	9.75	78.25	17.00	32.00	40.00	73.25
Dec. 14-15	18.50	11.80	9.75	78.75	17.00	32.00	40.00	73.25
Dec. 8-13	18.50	11.80	9.75	79.00	17.00	32.00	40.00	73.25
Dec. 5-7	18.50	11.80	9.75	80.75–81.00	17.00	32.00	40.00	73.25
Dec. 2-3	18.50	11.80	9.75	81.00	17.00	32.00	40.00	73.25
Dec. 1	18.50	11.80	9.75	83.00	17.00	32.00	40.00	73.25
Nov. Avg.	18.427	12.348	9.760	89.823	17.00	32.00	40.00	73.25
Nov. 30	18.50	11.80	9.75	83.25	17.00	32.00	40.00	73.25
Nov. 28-29	18.50	11.80	9.75	84.75	17.00	32.00	40.00	73.25
Nov. 21-26	18.50	11.80	9.75	85.00	17.00	32.00	40.00	73.25
Nov. 18-19	18.50	12.30	9.75	85.50	17.00	32.00	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.
Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84c; oval 28.34c; cast 26.87c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 46.50c f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.75c; over 250 lb, 24.75c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00; under 100 lb, 64.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbls, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over, 94.00c, 500 to 999 lb, 94.50c; 200 to 499 lb 95.00c; less than 200 lb, 96.50c; ball, 1000 lb and over, 96.25c; 500 to 999 lb, 96.75c; 200 to 499 lb 97.25c; less than 200 lb, 98.75c f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 59.7c; 100 or 300 lb drums only, 100 to 500 lb, 51.4c; 600 to 1900 lb, 49.0c; 2000 to 9900 lb, 47.3c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c, f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.
Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 86.20c; more than 2000 lb, 84.20c, f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, 72.59c; 100 lb kegs 73.59c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%	14.50	14.25	7.25
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze	12.00	11.75	11.12½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.75; composition red brass 12.50-12.75; radiators 10.00; heavy yellow brass 9.50-9.75.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; refinery brass (60% copper) per dry copper content 13.50.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire, No. 1 13.50-13.75, No. 2 12.50-12.75; light copper 11.50-11.75; No. 1 composition red brass 11.00-11.25; No. 1 composition turnings 10.25-10.50; mixed brass turnings 6.25-6.50; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.00-6.25; heavy yellow brass 6.75-7.00; new brass rod ends 9.75-10.00, auto radiators, unsweated 8.00-8.25; cocks and faucets, 8.50-8.75; brass pipe 9.00-9.25.
Lead: Heavy 9.25-9.50, battery plates 4.50; linotype and stereotype 10.00-10.25; electrotype 9.00-9.25; mixed babbitt 9.25-9.50.
Zinc: Old zinc 4.25-4.75; new die cast scrap 4.00-4.50; old die cast scrap 3.00-3.25.
Tin: No. 1 pewter 42.00-42.50; block tin pipe 63.00-63.50, No. 1 babbitt 30.00-30.50.
Aluminum: Clippings 2S 10.50-11.00; old sheets 7.50-8.00, crankcase 7.50-8.00, borings and turnings 3.00-3.50.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Dec. 22, 1949; gross tons except as noted. Changes shown in *italics*.

STEELMAKING SCRAP COMPOSITE

Dec. 22	$27.25
Dec. 15	28.25
Dec. 1949	28.96
Dec. 1948	43.25
Dec. 1944	18.95

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$30.00*
No. 2 Heavy Melt.	*27.00-28.00*
No. 1 Busheling	*30.00*
No. 1 Bundles	*30.00*
No. 2 Bundles	*25.00-26.00**
No. 3 Bundles	*23.00-24.00**
Heavy Turnings	*23.50-24.50*
Machine Shop Turnings	21.00-22.00†
Mixed Borings, Turnings	22.00-23.00†
Short Shovel Turnings	25.00-26.00
Cast Iron Borings	22.50-23.00
Low Phos. Steel	34.50-35.50

Cast Iron Grades*

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	39.00-40.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	27.00-28.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	33.50-34.00
Axles	36.00-37.00
Rails, Random Length	36.00-37.00
Rails, 2 ft. and under	40.00-41.00
Rails, 18 in. and under	41.00-42.00
Railroad Specialties	36.00-37.00
Angles, Splice Bars	34.00-34.50

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*28.50-29.00*
No. 2 Heavy Melt. Steel	*26.50-27.00*
No. 1 Busheling	*28.50-29.00*
No. 1 Bundles	*28.50-29.00*
No. 2 Bundles	23.50
Machine Shop Turnings	*18.00-18.50*
Mixed Borings, Turnings	*19.50-20.00*
Short Shovel Turnings	*19.50-20.00*
Cast Iron Borings	*19.50-20.00*
Bar Crops and Plate	*29.50-30.50*
Punchings & Plate Scrap	*31.00-31.50*
Cut Structurals	32.00-32.50

Cast Iron Grades

No. 1 Cupola	*43.50-44.50*
Charging Box Cast	37.00-38.00
Stove Plate	*36.00-37.00*
Heavy Breakable Cast	*34.00-35.00*
Unstripped Motor Blocks	*31.50-32.50*
Brake Shoes	*29.00-30.00*
Clean Auto Cast	*44.00-45.00*
No. 1 Wheels	*38.00-39.00*
Burnt Cast	*32.00-33.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*32.00-33.00*
R.R. Malleable	38.50-39.00
Rails, 3 ft and under	43.00-44.00
Rails, 18 in. and under	44.00-45.00
Rails, Random Lengths	38.00-39.00
Cast Steel	*34.00-35.00*
Railroad Specialties	*35.00-35.50*
Uncut Tires	*36.00-37.00*
Angles, Splice Bars	*40.00-41.00*

VALLEY

No. 1 Heavy Melt. Steel	*$30.50-31.00*
No. 2 Heavy Melt. Steel	*28.50-29.50*
No. 1 Bundles	*30.50-31.00*
No. 2 Bundles	24.00-24.50
Machine Shop Turnings	22.50-23.00
Short Shovel Turnings	24.50-25.00
Cast Iron Borings	23.50-24.00
Low Phos.	*31.50-32.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*32.00-33.00*

PHILADELPHIA

No. 1 Heavy Melt. Steel	$24.50-25.00
No. 2 Heavy Melt. Steel	23.00-23.50
No. 1 Busheling	23.00-23.50
No. 1 Bundles	25.00
No. 2 Bundles	21.50-22.00*
Machine Shop Turnings	16.50-17.50
Short Shovel Turnings	18.50
Mixed Borings, Turnings	15.50-16.00*
Bar Crop and Plate	27.50-28.50
Punchings & Plate Scrap	27.50-28.50
Cut Structurals	26.00-27.00
Elec. Furnace Bundles	26.00
Heavy Turnings	24.00-25.00
No. 1 Chemical Borings	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	35.00
No. 1 Machinery Cast	37.00-38.00
Charging Box Cast	35.00-36.00
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	30.00-31.00
Clean Auto Cast	37.00
No. 1 Wheels	37.50-38.50
Malleable	39.00

* Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$27.00
No. 2 Heavy Melt. Steel	25.00
No. 1 Busheling	26.00
No. 1 Bundles	27.00
No. 2 Bundles	20.00
Machine Shop Turnings	*14.00*
Short Shovel Turnings	*17.00*
Mixed Borings, Turnings	17.00
Cast Iron Boring	*17.00*

Cast Iron Grades

No. 1 Cupola Cast	*40.00*
Charging Box Cast	32.00
Heavy Breakable Cast	*34.00*
Stove Plate	30.00
Unstripped Motor Blocks	22.00
Brake Shoes	22.00
Clean Auto Cast	*40.00*
Drop Broken Cast	43.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00
R.R. Malleable	32.00
Rails, Rerolling	36.00
Rails, Random Length	34.00
Rails, 18 in. and under	43.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	*$23.00-24.00*
No. 1 Bundles	*27.00-28.00*
No. 2 Bundles	*23.00-24.00*
No. 1 Busheling	*27.00-28.00*
Machine Shop Turnings	*16.00-17.00*
Mixed Borings, Turnings	*16.00-17.00*
Short Shovel Turnings	*18.00-19.00*
Cast Iron Borings	*18.00-19.00*
Punchings & Plate Scrap	*27.00-28.00*

Cast Iron Grades

No. 1 Cupola Cast	*35.00-36.00*
Heavy Breakable Cast	*31.00-32.00*
Clean Auto Cast	*35.00-36.00*

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	25.50-26.00
Machine Shop Turnings	20.00-20.50
Mixed Borings, Turnings	21.00-21.50
Cast Iron Borings	21.00-21.50
Short Shovelings	22.50-23.00
Low Phos.	31.50-32.00

Cast Iron Grades

No. 1 Machinery	39.50-40.00
No. 1 Cupola	36.00-37.00
Malleable	**34.50-35.00**

Railroad Scrap

Rails, 2 ft. and under.	38.00-39.00
Scrap rails	35.00-36.00
Specialties	35.00-36.00
No. 1 car wheels	36.00-37.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$21.00
No. 2 Heavy Melt. Steel	18.00-19.00
No. 1 Busheling	18.00-19.00
No. 1 Bundles	21.00
No. 2 Bundles	17.00-18.00
Machine Shop Turnings	**11.00-12.00**
Mixed Borings, Turnings	**11.00-12.00**
Short Shovel Turnings.	**11.00-12.00**
Punchings & Plate Scrap	21.00-22.00
Cut Structurals	21.00-22.00
Elec. Furnace Bundles.	21.00-22.00

Cast Iron Grades

No. 1 Cupola Cast	**29.00-30.00**
No. 1 Machinery	**31.00-32.00**
Charging Box Cast	**25.00-26.00**
Heavy Breakable	**25.00-26.00**
Unstripped Motor Blocks	**26.00**
Malleable	**36.00**

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$20.00-20.50
No. 2 Heavy Melt. Steel	17.00-17.50
No. 1 Bundles	20.00-20.50
No. 1 Busheling	17.50-18.00
Machine Shop Turnings	11.50-12.00
Mixed Borings, Turnings	11.50-12.00
Short Shovel Turnings.	13.50-14.50
Bar Crops and Plate	22.00-22.50
Punchings & Plate Scrap	22.00-22.50
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	30.00-33.00
Mixed Cast	26.00-27.00
Heavy Breakable Cast	27.00-28.00
Stove Plate	24.00-25.00
Unstripped Motor Blocks	20.00-21.00

CHICAGO

No. 1 Heavy Melt. Steel	*$26.00-28.00*
No. 2 Heavy Melt. Steel	*24.00-25.00*
No. 1 Bundles	*26.00-28.00*
No. 2 Bundles	*22.00-23.00*
Machine Shop Turnings	18.00-19.00
Mixed Borings, Turnings	18.00-19.00
Short Shovel Turnings.	19.50-20.50
Cast Iron Borings	18.00-19.00
Bar Crops and Plate	30.00-31.00
Punchings	30.00-31.00
Elec. Furnace Bundles.	28.00-29.00
Heavy Turnings	23.00-24.00
Cut Structurals	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-40.00
Clean Auto Cast	42.00-43.00
No. 1 Wheels	32.00-33.00
Stove Plate	32.00-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*28.50-29.50*
Malleable	37.00-38.00
Rails, Rerolling	43.00-44.00
Rails, Random Lengths	36.00-37.00
Rails, 2 ft. and under.	41.00-42.00
Rails, 18 in. and under	42.00-43.00
Railroad Specialties	32.00-33.00
Angles, Splice Bars	36.00-37.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	**$25.00**
No. 2 Heavy Melt. Steel	**24.50**
No. 1 Busheling	**24.00**
No. 2 Bundles	**22.00**
Machine Shop Turnings	**15.00**
Mixed Borings, Turnings	**15.00**
Short Shovel Turnings.	**19.00**
Cast Iron Borings	**18.00**
Bar Crops and Plate	**30.00**
Cut Structurals	**23.00**

Cast Iron Grades

No. 1 Cupola Cast	**34.00-35.00**
Stove Plate	**28.00-30.00**
No. 1 Wheels	**23.00-24.00**

Railroad Scrap

No. 1 R.R. Heavy Melt.	**28.00**
R. R. Malleable	**nominal**
Rails, Rerolling	**37.00**
Rails 3 ft. and under	**25.00-26.00**
Angles and Splice Bars	**31.00-33.00**

ST. LOUIS

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	26.00-27.00
Machine Shop Turnings	16.00-18.00
Short Shovel Turnings	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	28.00-29.00
Brake Shoes	30.00-31.00
Clean Auto Cast	38.00-39.00
Burnt Cast	30.00-31.00

Railroad Scrap

R.R. Malleable	29.00-30.00
Rails, Rerolling	39.00-40.00
Rails, Random Lengths	*32.00-33.00*
Rails, 3 ft. and under	37.00-38.00
Uncut Tires	29.00-30.00
Angles, Splice Bars	34.00-36.00
Railroad Specialties	31.00-32.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Wheels	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	22.00
Cut Structurals	22.00
Elec. Furnace Bundles.	23.00

Cast Iron Grades

No. 1 Cupola Cast	25.00
Heavy Breakable Cast.	20.00
Stove Plate	20.00
Unstripped Motor Blocks	18.00
Malleable	20.00
Brake Shoes	18.00
Clean Auto Cast	25.00
No. 1 Wheels	25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	24.00
Elec. Furnace Bundles	25.00

Cast Iron Grades

No. 1 Cupola Cast	28.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	32.00

HAMILTON, ONT.

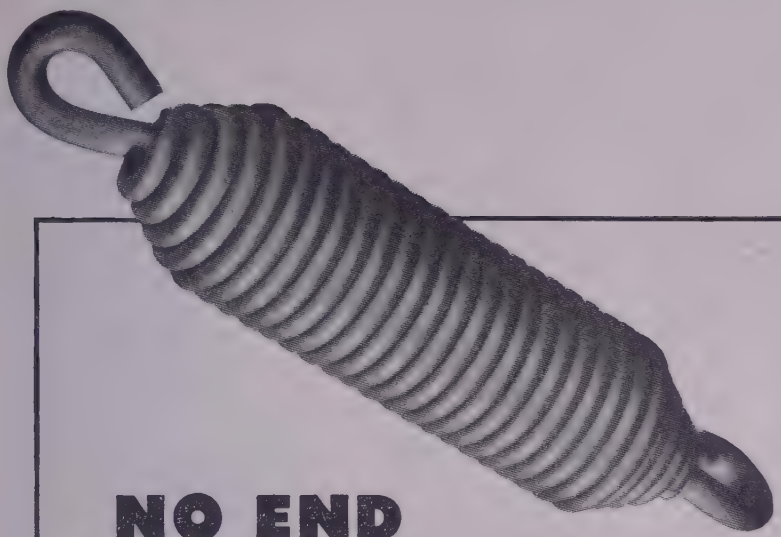
(Delivered prices)

Heavy Melt.	$24.00
No. 1 Bundles	24.00
Mechanical Bundles	22.00
Mixed Steel Scrap	20.00
Mixed Borings, Turnings	18.00
Rails, Remelting	24.00
Rails, Rerolling	27.00
Busheling	18.00
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades*

Cast	40.00-43.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.



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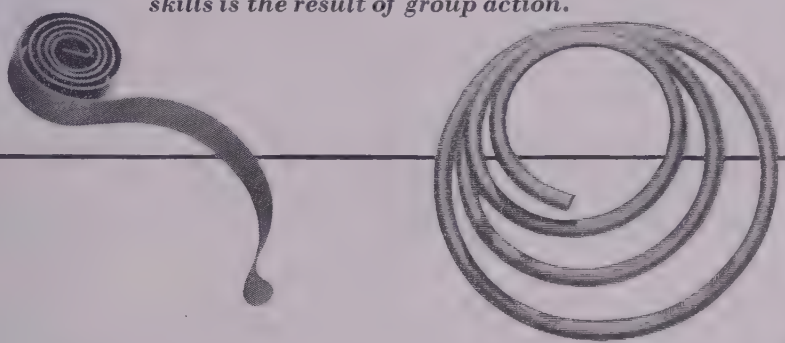

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Sheets Strip . . .

Sheet and Strip Prices, Page 85 & 86 & 87

Cleveland—Major interest in the flat-rolled steel market centers in the price changes currently being put into effect. The larger independent producers last week were announcing new price schedules, these being much in line with those announced the week preceding by subsidiaries of the U. S. Steel Corp. Both mill prices and extras are included in the upward revisions.

Small mills, also are effecting advances. For instance, Greer Steel Co., Dover, O., increased cold-rolled strip and cold-rolled flat wire 15 cents per cwt, now quoting the former 4.15c mill, and the latter 5.15c.

Pressure for sheets and strip continues unusually heavy for this season. However, expectations are that some easing in demand will be experienced over the holidays. Producers will enter the new year with heavy order backlogs in virtually all flat-rolled items. In fact, the mills have sufficient business to support capacity operations beyond March.

Boston—One of the few producers of tack plate, an important product in this area, has advanced prices $10 per ton, while a leading supplier of hot-rolled strip has revised extras on 120-inch cut lengths. Second-quarter schedules are filling on cold-rolled carbon and galvanized sheets. Pressure for tin plate, resulting from inventory depletion by canmakers during the steel strike, is contributing to stringency in light-gage cold-rolled sheets.

Of 2147 tons, flat steel strapping, bought by Chicago quartermaster purchasing office, 842 tons went to Stanley Works, New Britain, Conn., at $214,850. Order also includes 6545 box seals.

Consumers find the real sting embodied in the price advances now being affected is in extra revisions. Coupled with basic increases these range up to $8 per ton on some gages and grades. Nonintegrated producers of cold strip are digesting the changes before acting on their own schedules.

New York—In view of the upward trend in prices, sheet consumers are pressing especially hard for overdue tonnage from mills which have not as yet altered their schedules. Otherwise, the situation is much the same as it has been over recent weeks, with consumers not only anxious to obtain tonnage against arrearages but to place new orders. Producers generally are booked up for first quarter; some for the entire first half insofar as the major grades are concerned. Actually sellers generally could book themselves for the first six months were they so disposed.

Chicago—Higher prices will have no appreciable effect on sheet sales for at least six months, in view of extremely heavy demand which is being satisfied only partially by mill allocations. Very little new activity is reported in the conversion market and the gray market is on the wane.

It is impossible to determine how much more steel than is presently granted under quotas could be absorbed by metalwroking companies. In many cases, steel orders are being placed for second quarter, although finished product orders for that period are still in embryo stage.

A major prefabricated steel house manufacturer who disposed of a large part of its steel inventory during the strike is now actively seeking cold-rolled and enameling sheets.

It looks as though another full week at least will be required before all local producers can adjust their prices.

Cincinnati — District sheet mills have filled schedules for first quarter, with demand running strong. Consumers are pressing for deliveries, thus eliminating any hint of a seasonal letdown. Production was suspended for two weeks during a motor repair job at Armco's mill in Ashland, Ky.

San Francisco—Demand is still insistent for strip and galvanized sheets, but there has been some slight slackening in inquiry for other flat-rolled products. Supplies of all types are scarce.

Structural Shapes . . .

Structural Shape Prices, Page 85

Boston—Fabricated structural steel prices, with estimates for private work lower and increasing for public projects, show additional weakness and are far below earlier postwar peaks. More district shops are estimating and getting bridge contracts; inquiry for the first bridges required for the Circumferential highway, Massachusetts, are out for bids. This project will take up to 40 structures. From eastern Pennsylvania standard shapes are available in four weeks or slightly under while deliveries from Pittsburgh range up to one month longer. Foreign shapes are offered Boston from $15 to $18 per ton under domestic steel.

Cleveland — Structural fabricators report increasing competition for business as seasonal influences tend to contract volume. Some price shading is noted and with structural shape prices going up $4 per ton plus higher extras, some fabricators express concern for the stability of their businesses over coming months. Expectations are some of the increase in mill prices may be absorbed, but fabricators doubt they can take up the sharp increase effected in mill extras on structurals.

Seattle—Business is slow with fabricating plants. Backlogs are down, but considerable important work is up for figures in the immediate future. University of Washington stadium, Seattle, will require about 1000 tons, an equal tonnage for the Detroit dam, Oregon, and other projects involving shapes. Willamette Iron & Steel Co., Portland, is low $419,839, to U. S. Engineer for a bascule bridge for McNary dam navigation lock, involving 500 tons.

Army Awards Steel Contracts

Chicago—Quartermaster Purchasing Office of the Army, this city, has awarded two steel orders totaling $185,749 to local producers. Signode Steel Strapping Co. will supply 2,225,000 units of steel box strapping and Acme Steel Co. will supply 1,380,000 pounds of flat steel staples.

Steel Bars . . .

Bar Prices, Page 85

Boston—Mild upturn in carbon bar specifications is uneven and spotty, although production in Connecticut is up with a Hartford cold-drawn mill operating near capacity. On small sizes, ⅝-inch and under, bookings extend well into first quarter on hot-rolled carbon, but on other sizes there are openings for late January shipment. Stocks of cold-drawn in the smaller sizes are lower and less spot tonnage from inventory is available. There are releases from textile machinery builders, forge shops and warehouses, but forward commitments are generally on the conservative side.

New York—Most hot carbon bar producers will enter the new year with arrearages of probably no more than two or three weeks. Demand has been fairly active, but sellers have been able to become reasonably current despite the steel strike. Most delivery promises against new orders range four to five weeks, although some mills are booked ahead a little more extensively. In general, producers anticipate an increase in demand over first quarter, due in part to better activity in machinery and allied lines, and to a possible quickening in railroad requirements which have long been dormant. An easy situation continues in cold-drawn bars.

Philadelphia — Producers of bars now report they are booked into February.

Cleveland—Mill delivery schedules on hot carbon bars extend into first quarter but demand pressure is not comparable with that in sheets and strip.

Alloy bars are relatively easy and cold-finished material is available in some sizes for early shipment.

Industry-wide upward adjustments in bar prices are being made following the increase of $2 per ton on hot carbon bars and $4 on alloy bars effected by U. S. Steel subsidiaries.

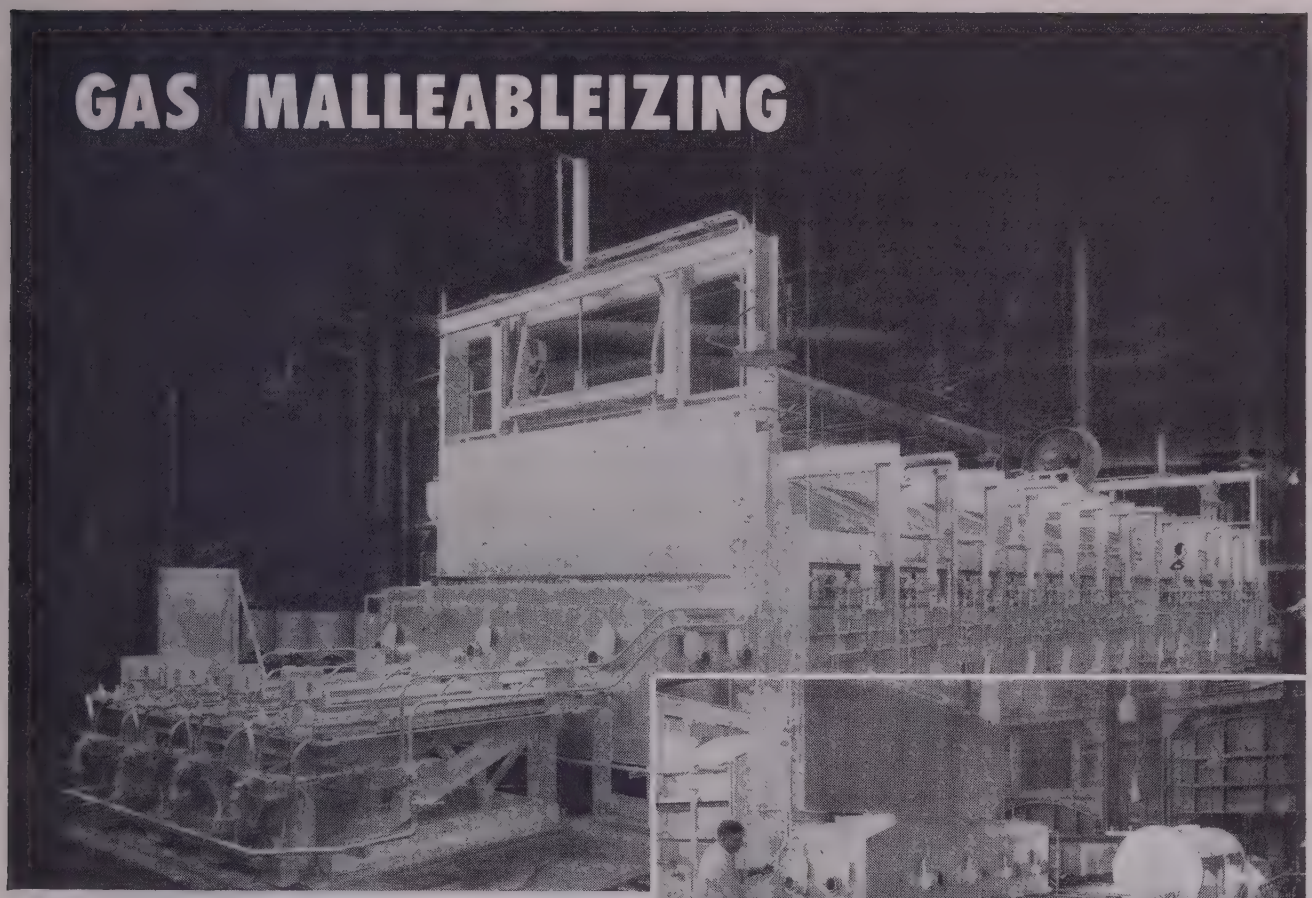
Last week the larger independent producers were going over their price schedules, several of them having announced their intention of making upward revisions.

Cold-drawers are expected to increase their prices on cold-finished bars to compensate for the boost on hot bars.

Chicago—One local producer says it may be after the first of the year before a new price schedule will be announced. Other mills' schedules soon to be announced in detail are expected to conform closely with U. S. Steel's. In the district, some rolling capacity is still open in first quarter although it is expected that this will be filled within the next few weeks.

St. Louis—Merchant bars continue under strong, steady pressure. Mills are attempting to hold down orders and are rejecting many. Books are filled through the first quarter and those for the second quarter will not be opened before the first of the year. There was some hope bar demand might drop when consumers concerned with the toy manufacturing business neared the Christmas season, but no such drop is in sight. Forecast now is that bar demand may hold up well to mid-1950.

GAS MALLEABLEIZING



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Automatic discharge system emphasizes production-line characteristics of Gas Malleableizing Furnace.

Photos courtesy of Surface Combustion Corporation, Toledo, Ohio, Manufacturers of Industrial GAS Furnaces.

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Wire . . .

Wire Prices, Page 87

Boston—Backlog and demand for heading wire is substantial with moderate carryovers confronting most producers. Bright and low carbon buying is active, but new orders for upholstery spring wire are slower, although pressure for deferred tonnage is strong. Round wire for flattening into conduit steel is active. Manufacturers' wire schedules are well taken up for first quarter.

Tubular Goods . . .

Tubular Goods Prices, Page 88

Pittsburgh—Spang Chalfant Division of National Supply Co. increased prices, effective Dec. 17, $5 per net ton for all sizes and grades of seamless pipe and oil country casing, and $8 per net ton for oil country tubing and drill pipe. Discounts on seamless pipe were reduced 2½ points.

An increase of $5 per ton applies to continuous weld ½-inch and larger, and lap weld black and galvanized pipe, all sizes and weights, with a reduction of 2½ points in discounts.

Extras and deductions in all classes of tubular goods, both weld and seamless, also were revised upwards.

National Supply also announced its policy of prices in effect at date of shipment continues. No changes were announced in seamless pressure, mechanical tubing and coupling stock, both carbon and alloy.

Boston—Merchant steel pipe orders placed for November shipment are beginning to come through from some mills and considerable fourth quarter volume will carry over into next year. Distributor stocks are low and under pressure for delayed tonnage, although demand on jobbers against new orders is somewhat easier. Some mills have not yet firmly entered new orders, waiting until old volume is shipped before scheduling in late January or early February. Delivery on mechanical tubing is relatively prompt, from two to five weeks on hot finished, depending on size, and from three to seven weeks on cold drawn.

St. Louis—Pipe scarcity in this district persists with demand pressure second only to sheets. One pipe mill reports that business already on books will take care of entire output through April. A number of occasional emergency orders will have to be worked in each quarter.

Second quarter books are not yet open, but there is no doubt allocations will have to continue.

Residential and commercial building is responsible for most of the excess pressure, although other users are not moderating their demands. A spurt of school and hospital construction in southern states is adding to the burden.

Demand is evenly distributed through ½-in. to 2-in. sizes, with 2 to 3-in. diameters under somewhat less pressure.

Pipe mills have price changes under consideration.

Seattle—Demand for cast iron pipe is nominal and little improvement is expected until the larger buyers, principally Pacific northwestern cities, have used current stocks, purchased last year during the shortage. Meanwhile competing types of pipe are making inroads.

Export Steel Prices Rise

New York—United States Steel Export Co., this city, has revised its price schedule on the steel products named below concurrently with changes in domestic prices announced by the steel producing subsidiaries of United States Steel Corp. These revised prices, effective as of Dec. 16, also reflect certain changes required by adjustments in the price of foreign-made steel products resulting from devaluation in the British pound and other foreign currencies. The prices include freight to New York, Philadelphia or Baltimore. Certain of the seller's lists of extras and deductions, appyling to the company's products, have been revised effective as of Dec. 16. Prices previously announced by the seller on certain other steel products remain unchanged. All sales are subject to seller's prices in effect at time of shipment.

The new schedule follows:

CARBON STEELS

	Per net ton
Billets, Blooms and Slabs:	
Re-rolling quality	$61.76
Forging quality	71.76
Tube Rounds	84.76
	Per 100 lb
Skelp	$3.69
Standard Structural Shapes	3.92
C.B. Sections and Bearing Piles	3.92
Plates, Plain	4.02
Plates, Floor	5.07
Bars, Hot-Rolled	3.99
Bars, Concrete Reinforcing	3.99
Bars, Fabricated Reinforcing	4.87
Steel Sheet Piling	4.72
Strip, Hot-Rolled	3.79
Strip, Cold-Rolled	4.71
Tight Cooperage Hoops	4.14
Axles	5.77
Electrical (electrical grade) Cut Lengths, 22 Ga.	7.47
Tin Plate 107#:	Per Base Box
American Coke, 1.25 lb coating	$8.13
American Coke, 1.50 lb coating	8.38
Ferrostan—unassorted:	
0.25 lb coating	7.08
0.50 lb coating	7.33
0.75 lb coating	7.63
Manufacturing Ternes:	
Special coated, unassorted	7.28
Unassorted	7.83
Black Plate Can Making Quality Superdraw, unassorted	6.38
Wire Products:	Per 100 lb
Wire Rods	$4.29
Bright Wire Nails	5.99
Bright Staples, 9 Ga.	6.79
Galvanized Staples, 9 Ga.	7.74
Barbed Wire:	Per 80 Rod Spool
Lyman, 4 pt. 5 in.	$6.03
Glidden, 2 pt. 4 in.	5.53
	Per 100 lb
Glidden 4 pt. 3 in. or 6 in.	7.03
Iowa 4 pt. 3 in. or 6 in.	7.03
Waukegan 4 pt. 3 in. or 6 in.	7.03

ALLOY STEELS

	Per net ton
Billets, Blooms and Slabs:	
Forging quality	$71.76
	Per 100 lb
Bars, Hot-rolled	$4.47
Bars, Cold-finished	5.17
Plates	4.92
Standard Structural Shapes	4.57
Strip, Hot-rolled	5.62

HIGH-STRENGTH STEELS

	Per 100 lb		
	Corten	Manten	A-R Steels
Plates	$5.87	$5.07	$5.17
Stand. Structurals	5.67	4.87	....
C. B. Sections	5.62	4.92	....
Bars, Hot-Rolled	5.72	4.77	5.12

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 85

Cleveland—Seasonal forces are exerting increasingly contracting influences on demand for reinforcing material. Small building jobs are coming out but overall tonnage moving is not impressive. Very noticeable slump in demand is expected over the holidays. Outlook for early 1950 is considered promising with considerable public building work in prospect. Reinforcing bar prices are expected to be adjusted upward generally as result of the $2 per ton increase initiated a week ago by United States Steel Corp. subsidiaries.

Boston—Pending volume is heavy, notably for bridges and highway work which Massachusetts State Department of Public Works seeks to get under contract before year-end. An estimated 4000 tons of concrete reinforcing bars are required for bridges, Circumferential highway, while 2600 tons are needed for Sullivan Square, Boston, reconstruction. To match this high demand, supply of billet steel bars with fabricators and distributors is improved. Buying of rail steel bars has been heavier at prices slightly lower than the usual differential with new billet stock.

Seattle—Rollings mills are booking a few small tonnages of reinforcing bars, but demands are slow. Plants will be closed for the holidays. Northwest Steel Rolling Mills Inc. this city will be down for more than a week, although the electric furnaces will continue to augment the ingot supply. First quarter outlook is promising. Largest reinforcing projects pending are the Detroit dam, 5500 tons; the Seattle viaduct, 1500 tons; and an unstated tonnage for the Washington state snowshed contract, bids in January. Bethlehem Pacific Coast Steel Corp., Seattle, has booked about 200 tons in miscellaneous small jobs.

Plates . . .

Plate Prices, Page 85

New York—Plate demand continues restricted with little change in volume one way or the other. Meanwhile, the price situation is being carefully watched although it is not certain it will become stabilized before the end of the year, if then. Virtually all producers will enter January fairly caught up with current commitments.

Leading fabricators of water tanks report water shortage in the metropolitan area is stimulating interest from civic and utility groups in tanks, ranging from the smaller sizes up to tanks with capacity of 2 million gallons. Fabricators of this classification report continued shrinkage in their backlogs, however, the average running around three to four months.

The Coatesville, Pa., plate producer expects to close down its 206-inch mill for electrification some time before end of January. It may be down for three months. Originally it was scheduled to suspend Dec. 1, but action was delayed primarily because of the steel strike. Once this mill goes down, the company's 140-inch mill, which normally makes slabs for

the 206-inch unit, will be diverted to production of plates. It has a capacity for rolling plates up to a maximum width of around 126 inches. This smaller mill was electrified some months ago.

The company's 120-inch mill was closed down early last summer for maintenance repairs.

Boston—With one exception, plate fabricating shops are doing little forward buying, bulk of orders covering lighter gages. Deliveries are prompt, three to four weeks, and most mills go into 1950 with small backlogs. Early shipments, sometimes by truck from eastern Pennsylvania, tend to retard forward buying. Shipyards have fairly substantial backlogs, but will need additional work the coming year. Currently demand for large-diameter steel pipe accounts for several thousand tons of plates.

Philadelphia—Most plate sellers in the East can still accept business for shipment in January. Indications are most producers will have new price schedules in effect by the turn of the year.

San Francisco—Buying of plates is receding, and consumers show no tendency to order ahead. Supplies are ample to cover all needs at present.

Seattle—Plate fabricators report curtailed plant activity, backlogs low and ample materials available. Considerable new business is in prospect for the first quarter. Small jobs are fairly numerous, but tonnages involved are not heavy. Bids will be called soon for a tank farm for Freedom Valvoline Co.'s Seattle terminals, tonnage unstated.

Tin Plate . . .

Tin Plate Prices, Page 86

San Francisco—Average reduction of $3 a ton in Columbia Steel Co.'s tinplate prices for 1950 delivery is cheering to the large West Coast canning industry. Canners have been caught in a tight cost-price squeeze for more than a year. Prices on several major fruit and vegetable packs have been declining, but most costs have been rising. Lower tinplate prices, therefore, will help offset the price cuts which are in prospect if the packers are to move their large food inventories.

Pig Iron . . .

Pig Iron Prices, Page 84

Cleveland—Foundry operators appear comfortably stocked with pig iron. As a result they are not pressing sellers with orders. Holiday lull also is a factor contributing to sluggish demand. Some improvement in buying is expected after Jan. 1, expectations being that foundry schedules will be upped as large buyers of castings release specifications. Blast furnace operations in the Cleveland area are continuing at capacity. Pig iron prices are unchanged.

Cincinnati—Demand for merchant pig iron is unimproved. Most foundries are on light schedules and amply stocked with iron. Some improvement in the melt is anticipated at turn of the year.

New York—Demand for pig iron

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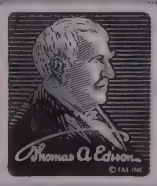

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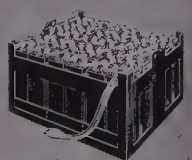

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reflects the holiday lull. A number of district foundries will be closed down practically the entire holiday week.

Philadelphia — Specifications are slower due to holiday influences. Various foundries will be closed down Christmas week.

St. Louis — Pig iron production slipped moderately last week, with minor "bugs" in one furnace dropping Koppers' daily output to 950 tons from a usual 1060. Overall demand holds surprisingly steady in view of spotty foundry business. Koppers' ground stocks have crept up a bit since its B furnace was blown in three weeks ago. Coking operations are at capacity.

Seattle—Foundry operations are seasonally reduced and do not exceed 40 per cent of capacity in this area. The outlook is fairly promising, however. Materials are in ample supply for present needs. Confirmation of tentative sales of European pig iron, reported last week, has not been received and prospective buyers are in doubt whether deliveries will be made. The foreign price delivered is about $5 under domestic.

Iron Ore . . .

Iron Ore Prices, Page 89

Cleveland—Stocks of iron ore at lower lake docks and furnaces on Dec. 1 totaled 44,786,469 gross tons, according to the monthly report of the Lake Superior Iron Ore Association.

On the same date last year stocks amounted to 45,160,225 tons.

With consumption running around 7 million tons monthly stocks are believed sufficient to support active blast furnace operations through the opening of the 1950 lake navigation season.

Consumption of lake ore in November totaled 7,057,850 tons, a sharp increase from the 876,792 tons used in October when blast furnace operations were curtailed by the steel strike. Total consumption of ore in 1949 to Dec. 1 was 64,072,301 tons compared with 73,153,156 in the like period of 1948.

On Dec. 1 active blast furnaces in the United States numbered 150 compared with 20 the month preceding and 171 on the like date a year ago.

Rails, Cars . . .

Track Material Prices, Page 87

New York—Further substantial buying of diesel electric locomotives features the railroad equipment market, with Atlantic Coast Line closing on 73 units costing more than $10 million. A slight betterment is noted in car demand, with the Burlington Lines announcing it will build $11 million worth of cars in its own shops in 1950, and the Merchants Despatch Transportation Corp. and the Wabash closing, respectively, 500 and 400 units in their own shops.

Birmingham—Illinois Central Railroad has placed an order with the Ensley mill of Tennessee Coal, Iron & Railroad Co. for 9000 tons of 131 pound rail. Delivery is scheduled to start in January.

Seattle—Contract to construct 450

cars, new type refrigerator sliding door, for Western Fruit Express has been awarded to Pacific Car & Foundry Co. Work will begin shortly at the Renton plant following rebuilding 200 cars each for Western Fruit Express and Fruit Growers Express. The new order calls for 50-ton cars weighing 100,000 pounds each.

Scrap . . .

Scrap Prices, Page 92

Detroit—Prices are lower by $1 to $3 per ton although there is a feeling in the trade that under the inflationary effect of the steel price increases the downward trend in the scrap market may be reversed when the large industrial lists appear this week.

Dealers are finding trouble moving heavy stock of No. 2 bundles and heavy melting in view of the reluctance of mills to accept this material while industrial scrap is available.

Start of the 42-inch reversing hot mill installed in the downriver electric furnace plant of the McLouth Steel Corp. ten day ago heightens prospects for early capacity melting operations at that point. It is estimated 600 cars of scrap a month will be required at this works for production of 28,000 tons of finished steel.

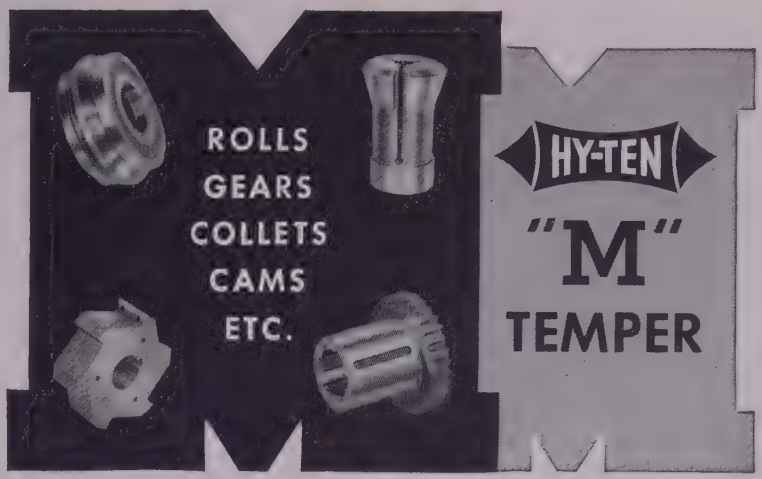
Cleveland—Desire of scrap consumers to keep inventories as low as possible at yearend has resulted in an extremely quiet market. This marks a definite return to normal prewar practice and is not causing any undue concern among brokers. Trend in the new year will be governed by the rate of consumption, now expected to be heavy. Prices have been lowered $1 a ton on most steelmaking grades, while other grades generally are off 50 cents to $1. A sale of No. 1 heavy melting was made last week to a Valley mill at $31 a ton.

Cincinnati—Iron and steel scrap prices are softer, with holiday dullness pervading the whole market. Turnings and borings are lower with demand absent. Top grades of cast scrap are also lower, and placement of tonnage is difficult because of the light foundry melt.

Chicago—A $2 drop in the buying price of industrial and railroad scrap for direct shipment was announced by a major mill, bringing the top quotation on No. 1 heavy melting steel to $28 and on No. 1 railroad heavy melting to $29.50. In the thin open market, buying is for limited quantities, generally 500 tons at a time with brokers quoting about $2 under the earmarked prices.

St. Louis—With most mills' supplies adequate to Jan. 1, and foundry demand continuing in the doldrums, the scrap market here continues marking time. Prices are virtually unchanged, but the undertone is soft. Shipments are good on old orders while awaiting turn of the new year.

Seattle — Although the principal buyer is still out of the market, steel scrap remains unchanged at $18 base. Bethlehem is using inventory and is not replenishing stocks until next month at the earliest. Foundries are paying a maximum of $25 for No. 1



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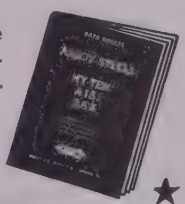

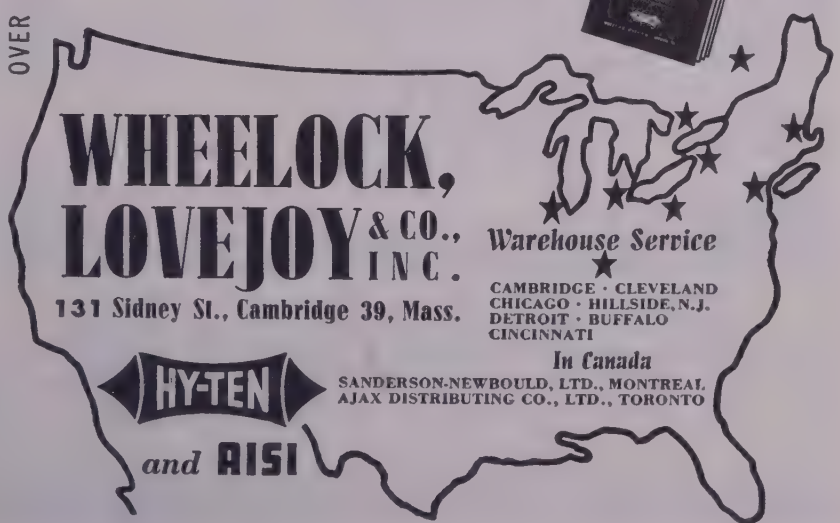

cupola cast which is available in ample tonnage for current requirements.

San Francisco—Mill buying continues to be only sufficient to maintain stockpiles. Considerable selectivity is shown in choosing material. Prices remain unchanged.

Warehouse . . .

Warehouse Prices, Page 89

Cleveland—Steel distributors in this area for the present are marking time on price policy pending analysis of the advances now being put into effect by the mills.

Warehousemen, generally, are disturbed by the extent of the mill increases, especially as reflected in extras. Some think the higher prices will discourage buying early in the new year.

The fact that warehouses receive their supplies from various mill sources and producing points is a factor for delay in the determining of new warehouse prices since all of the mills have not yet announced their specific product quotations.

Expectations are the distributors will mark up their price schedules as much as the mill advances at least. However, it is pointed out that for the warehouses to maintain their percentage return they should advance their quotations more than the mill markups.

Currently, demand for steel from warehouse is sluggish. This, in part, is due to holiday and yearend influences. Distributors' stocks are being replenished rapidly.

Boston — Demand for flat-rolled steel from warehouse holds better than for other products with distributor stocks of hot-rolled No. 10 to No. 16 gage, lighter gages of cold-rolled and galvanized unbalanced. Latter grade sells promptly without going into stock. Warehouses are concentrating on rebuilding inventories with replacements filling gaps with the exception of shortages in the sheet category.

Philadelphia—Local warehouses are encountering a little more active buying as result of the uptrend in mill prices. To date the distributors have made no change in their schedules pending further study of new mill lists.

Cincinnati—Demand for steel from warehouse has slumped sharply, and requests for deferred shipments indicate some fabricator shutdowns for the holidays. Sheets and plates move out quickly, but on the whole mill shipments now are at volume to enable a start toward better inventories. Prices are unchanged.

Chicago — Warehouses are taking time to study the new price structure before announcing new quotations. One major interest posted its new list on Thursday. Business is extremely brisk in only a few items, including flat-rolled and wide-flange beams, and many distributors now report that stocks of other steel products are either normal or rapidly approaching that position. One effect of the new extra schedules will be to put some business back in the warehouse trade. Certain of the new quantity and handling extras were determined with this in mind.

Seattle—Warehouse price lists are unchanged, although revisions are imminent. Increases by mills will be passed on to the consumer. Trade volume is reported good for this season, stocks being well rounded with the exception of galvanized sheets and nails which remain the critical items.

San Francisco—Distributors' business has declined and both volume and type of orders are spotty. Demand is strong for galvanized sheets, strip and some other flat-rolled items, but supplies are "critically" short.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

625 tons, four state bridges and pedestrian overpass, Leominster, Mass., to American Bridge Co., Pittsburgh; Bayer & Mingola, Worcester, general contractors.

510 tons, four state bridges, Shelton and Derby, Conn., on Shelton-Derby-Ansonia expressway, to American Bridge Co., Pittsburgh; Mariani Construction Co., New Haven, general contractor.

240 tons, reconstruction, bridge, Park drive, Boston, to Groisser & Shlager Iron Works, Somerville, Mass.; A. Singerella & Sons, Boston, general contractors.

200 tons, bridge, by-pass, Lowell, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Coleman Bros., Boston, general contractor.

125 tons, assembly building, General Motors Corp., Framingham, Mass., to West End Iron Works, Boston.

120 tons, shop extension, Raytheon Mfg. Corp., Waltham, Mass., to West End Iron Works, Boston.

STRUCTURAL STEEL PENDING

2000 tons, reconstruction, Sullivan Square, Boston; bids postponed to Dec. 20, state department of public works, Boston.

1800 tons, (previously reported 1600 tons) Lookout Point overcrossings; bids to U. S. Engineer, Portland, Oreg., Jan. 17.

1000 tons or more, University of Washington stadium; bids in January.

1000 tons, Detroit dam, Willamette river, Oregon; Consolidated Builders, general contractors.

550 tons, seven bridges, Reading-Woburn, Mass.; bids Dec. 20, state Department of Public Works, Boston.

500 tons, double leaf bascule bridge, navigation locks, McNary dam, Oregon; Willamette Iron & Steel Corp., Portland, Oreg., low $419,839.

287 tons, state bridge and viaduct, Newark, N. J.; bids Jan. 12.

240 tons, bridge over Deerfield river, Deerfield, Mass.; Warner Bros., Sunderland, Mass., low on general contract.

240 tons, bridge, Lynnfield-Wakefield, Mass.; state Department of Public Works, Boston.

210 tons, three-span continuous rolled beam bridge, end spans 50-foot each with 63-foot center span, relocation U. S. route 1, Fulton Terrace, New Haven, Conn.; Blakeslee Construction Co., New Haven, low on general contract, Dec. 12.

210 tons, two bridges, Burlington, Mass.; bids Dec. 20, state Department of Public Works, Boston.

150 tons, Jim Creek transmitter naval station, Washington state; bids in.

110 tons, 150-foot two-span continuous rolled beam bridge, Hebron avenue, over East Hartford-Glastonbury Expressway, Glastonbury, Co.; Brunnelle Construction Co., Southington, Conn., low on general contract, Dec. 12.

100 tons, state bridge, pony truss, Williams-

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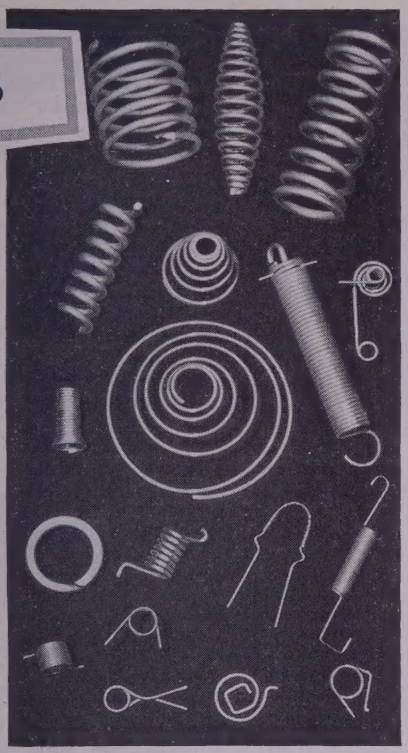

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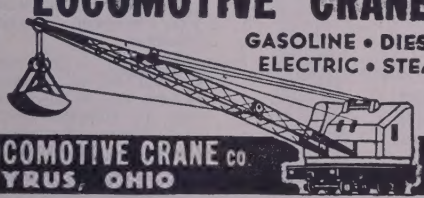

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town, Mass.; bids Dec. 20, state department of public works, Boston.

Unstated, 47 items galvanized steel buildings, etc.; bids to Bonneville Power Administration, Portland, Oreg., Jan. 6.

Unstated, concrete-steel bridge, Grant county, Washington; bids to Bureau of Reclamation about Feb. 1.

REINFORCING BARS . . .

REINFORCING BARS PLACED

225 tons, foundation, J. C. Penny Co. store, Indianapolis, to Hugh J. Baker & Co., that city.

210 tons, U. S. Coal & Coke Co., Lynch, Ky., to United States Steel Supply Co., Chicago.

200 tons, miscellaneous small construction jobs, to Bethlehem Pacific Coast Steel Corp., Seattle.

125 tons, state highway projects, Allegheny county, Pa., to United States Steel Supply Co., Chicago.

REINFORCING BARS PENDING

5500 tons, Detroit dam, Willamette river, Oregon; Consolidated Builders, general contractors.

1590 tons, Abbott Laboratories building, North Chicago, Ill.; bids asked.

2600 tons, reconstruction, Sullivan Square, Boston; bids Dec. 20, state department of public works, Boston.

1500 tons, Seattle traffic viaduct; bids in Dec. 20.

1100 tons, J. C. Penny Co. store, Indianapolis; bids asked.

450 tons, warehouse, Admiral Corp., Chicago; bids asked.

230 tons, including shapes, Roza project switchyards, Washington state; bids soon to Bureau of Reclamation.

140 tons, Marquette University, Milwaukee; bids asked.

135 tons, Evanston technical high school, Evanston, Ill.; bids asked.

125 tons, Seattle park department bear grotto; general contract to Fiksdal & Ness, Seattle, low $242,835.

100 tons, including shapes, installations at Hungry Horse project, Montana; bids soon to Bureau of Reclamation.

Unstated, 15-story apartment, Tacoma; general contract to Wick & Dahlgren, Seattle.

PLATES . . .

PLATES PENDING

Unstated, tank farm and terminals for Freedom Valvoline Oil Co., SW 11th and Hanford St., Seattle; Stevenson & Rubens, Seattle, engineers.

PIPE . . .

CAST IRON PIPE PLACED

850 tons, 8 to 16-inch, Metropolitan District commission, Hartford, Conn., to United States Pipe & Foundry Co., Burlington, N. J.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Atlantic Coast Line, 73 diesel-electric locomotive units, to the Electro-Motive Division, General Motors Corp., La Grange, Ill.; the order comprises thirty-six 1500 hp freight units, twenty-three 1500-hp road-switching units, nine 1200-hp switching units and five 2250-hp passenger units.

Lehigh Valley, 9 diesel-electric locomotive units, with five 1000-hp switchers going to the Baldwin Locomotive Works, Eddystone, Pa., three 1500-hp road switchers to American Locomotive Co., New York, and one 200-hp road switcher to the Electro-Motive Division, General Motors Corp., La Grange, Ill.

St. Louis-San Francisco, fourteen 2250-hp diesel-electric passenger locomotive units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Western Maryland, 20 diesel-electric locomotive units, to Electro-Motive Division, General Motors Corp., La Grange, Ill., and American Locomotive Co., New York; the former will build twelve 1500-hp. freight and four 1500-hp road-switching units and the latter four 1500-hp road-switching units.

RAILROAD CARS PLACED

Burlington Lines, $11,000,000 of cars, to its own shops for construction in 1950; the equipment will include 1400 steel sheathed box cars, 800 all-steel hopper cars and 300 baggage express cars.

Merchants Despatch Transportation Corp., 500 forty-foot refrigerator cars to its own shops in East Rochester, N. Y.

Wabash, 400 fifty-ton hopper cars, to its own shops.

Western Fruit Express, 450 fifty-ton refrigerator cars, Pacific Car & Foundry Co., Renton, Wash.

RAILS PLACED

Illinois Central, 9000 tons of 131-lb rail, to Ensley mill of Tennessee Coal, Iron & Railroad Co.; delivery to start in January.

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CONSTRUCTION AND ENTERPRISE

MISSOURI

ST. LOUIS—A new plant designed for specialized machinery production has been started at 1324 N. Rock Hill Rd. by Semple Developments Co. F. H. Semple is president of the firm, which specializes in engineering development and machine shop works.

OHIO

CLEVELAND—White Sewing Machine Corp. will construct a new multi-million dollar plant adjacent to its newly occupied factory at 11720 Berea Rd. Plans call for breaking ground in March for an engineering and office building and late in the fall for a woodworking plant for turning out sewing machine cabinets. After construction is completed in the spring of 1951, all company operations will have been transferred from its plant buildings at Main and Elm streets. Estimated cost of the new construction will exceed $3.5 million.

CINCINNATI—Leasing of approximately 19,000 sq ft of floor space in the manufacturing building at Benson street and the Pennsylvania railroad, has been announced by the recently-organized Reilly-Duerr Tank Co. Facilities will be used for the manufacture of metal tanks, repair and rebuilding of truck and trailer tanks as well as airport refuelers. Officials of the firm include Hugh K. Reilly, former general plant manager of Davis Welding & Mfg. Co., president and general manager; Leonard Duerr, former chief engineer, Davis Welding, vice president and general works manager; and O. B. Maxwell, president, Maxwell Co., secretary-treasurer.

CINCINNATI — The new $150,000 research building to be constructed by Proctor & Gamble Co. on the northern rim of Colerain twp. in Hamilton county, will house the most modern research equipment and laboratory facilities and permit material increase in the company's research and development activities. It is hoped the project will be completed for occupancy in about two years.

CINCINNATI—General Tool Co. of Reading, O., has been incorporated to manufacture and deal in special machinery, tools, dies, etc. It is incorporated by Harold S. Poe, Mary L. Poe and William J. Kramer.

COLUMBUS, O.—National Extrusion & Mfg. Co. has been organized through John W. Christensen, 44 E. Broad St., to manufacture and deal in aluminum, brass, etc. Salome M. Myer and Evelyn Morgan are incorporators besides Mr. Christensen.

DAYTON, O.—A new $120,000 sales and service station will be built at Stanley and Helena streets for International Harvester Co. for sales, display and servicing of International trucks. Completion is scheduled for March.

MARYSVILLE, O.—Baker Bros. are giving up their machine shop business on E. Fourth street, and are selling out their machine tools and other equipment.

MT. VERNON, O.—Cooper-Bessemer Corp.

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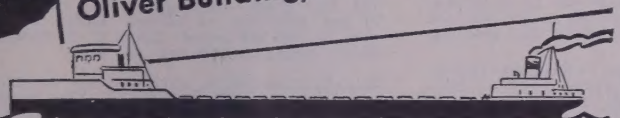

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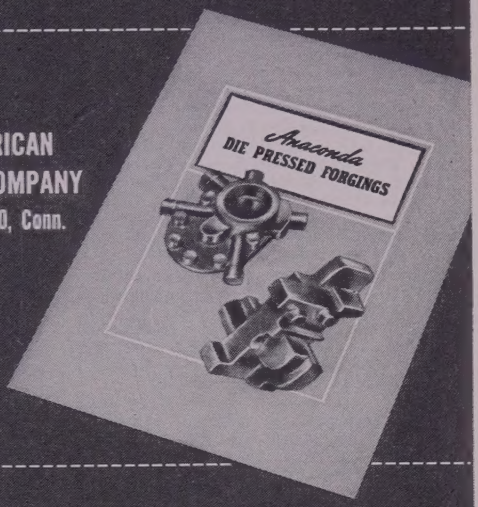

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has authorized expenditure of $1 million for further modernizing foundries and machine shops in Mt. Vernon and Grove City, Pa., plants, enabling the company to increase efficiency and volume production of meehanite metal and new ductile cast iron in its foundries and take advantage of revolutionary speeds in metal cutting made possible by expanded use of sintered carbide tools.

ORRVILLE, O.—Quality Castings Co. is starting operations in its new magnesium plant which has been built at the rear of the main plant on North Main street. Moving of the magnesium division out of the main plant will add that much more space to the iron foundry operations, which, like magnesium, has been crowded.

TREMONT, O.—Rohrer Farm Sales & Mfg. Co. Inc. has been formed to erect steel grain storage bins under the federal government's crop storage program. Under the corporate charter, Fay W. Rohrer and his son, Clarence Rohrer, the firm is licensed to manufacture hardware, household appliances, farm equipment and farm buildings.

WILLOUGHBY, O.—Barium & Chemicals Inc. plant on Stevens boulevard, damaged by a $150,000 fire last May, will be completely restored in an extensive construction program planned next spring. Temporary repairs, including new roof over damaged plant, already have been completed.

WOOSTER, O.—Wooster Rubber Co. plans further expansion of company operations next year. An official said the firm is entering into a large expansion program in both sales and production facilities.

YOUNGSTOWN—Kinray Industries Inc., a new corporation, has purchased at receivers sale all the assets of Kinray Mfg. Co. The new firm will manufacture screw machine products at 648 Marshall St. New equipment is to be purchased by the company which is headed by Samuel Gluck, president-treasurer. Other officers are Lawrence H. Gluck, vice president, and Aaron Grossman, secretary.

PENNSYLVANIA

ERIE, PA.—Kemp Mfg. Co. has been formed by Lyman N. Kemp, 22 E. 31st St., Daniel J. Kemp, 2668 Poplar St., Thomas H. Kemp, 2668 Poplar St., all of Erie, and Nelson J. Kemp of Birmingham, Ala. The company is to be located at 1027 E. 20th St., and will manufacture and distribute machinery and equipment.

NEW CASTLE, PA.—New Castle Packing Co. is preparing for construction of its new packing plant near Mahoning avenue. The plant will cost approximately $300,000.

FERROALLOYS

(*Continued from Page 89*)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c., f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo. each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%. Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%. Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8% Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed. 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.